Coal Age

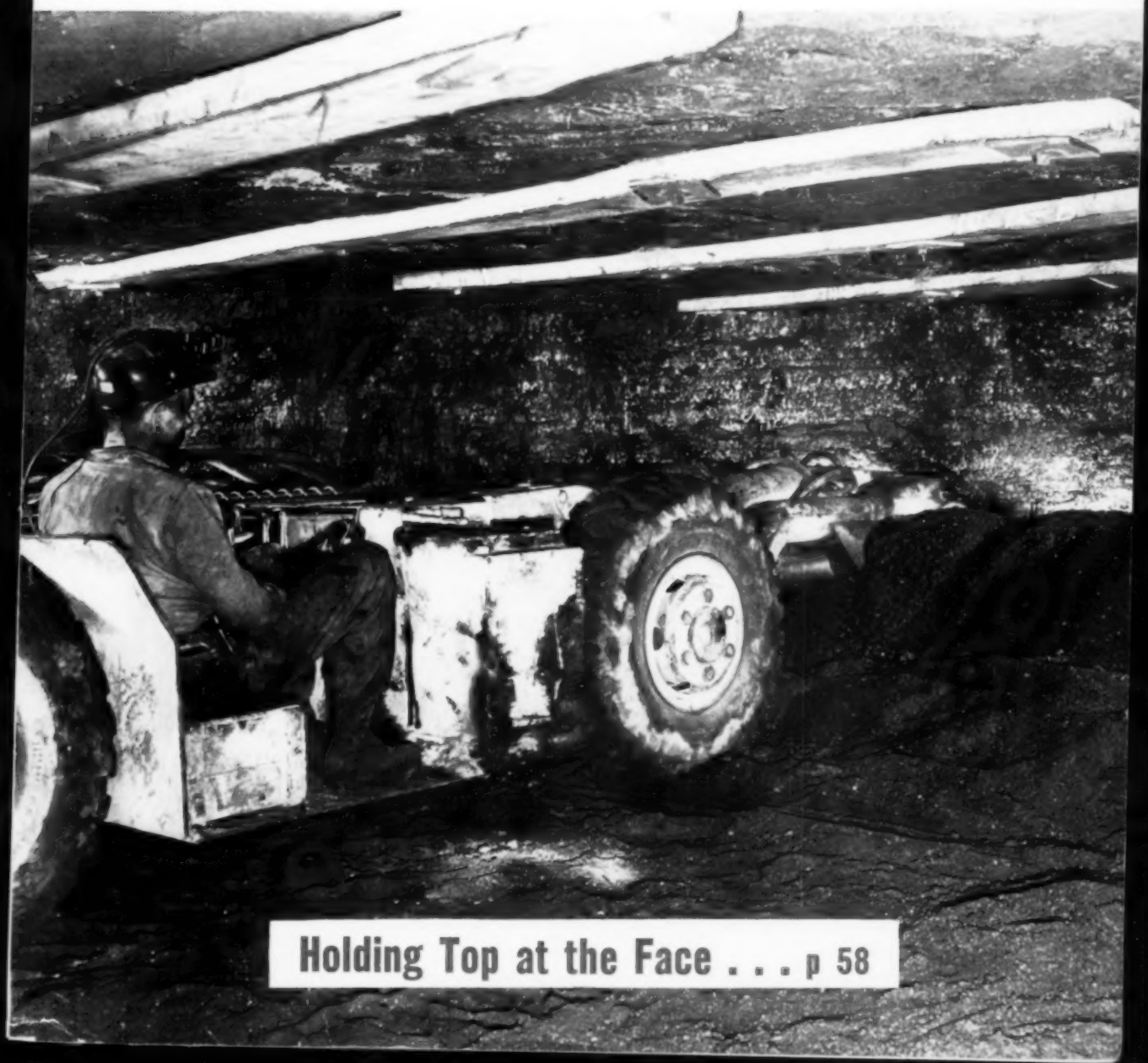
Lewis on Coal, the UMWA and Contracts . . . . . p 54

Flexibility in Stripping Enhances Results . . . p 64

Full Contents . . . . p 5

NOVEMBER, 1956

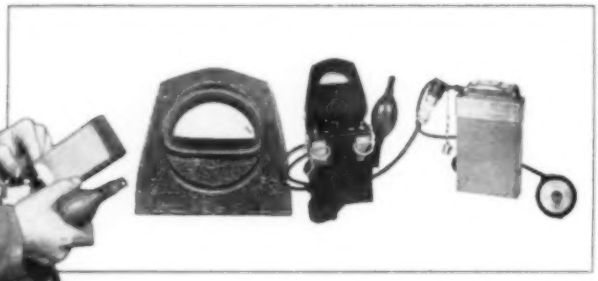
A McGRAW-HILL PUBLICATION — PRICE 50c



Holding Top at the Face . . . p 58

These M-S-A® instruments help you guard against

METHANE



M-S-A METHANE DETECTOR TYPE W-8

Accurate, portable instrument for measuring methane content of mine air at working face, break-throughs, air courses, and other points in mine where methane may accumulate. Operator squeezes rubber hand-bulb a few times, draws in air sample, and amount of methane is indicated on easy-to-read dial in less than 30 seconds. Two scale ranges—for greater reading accuracy—0 to 2% and 0 to 5%. U.S. Bureau of Mines Approved. Write for bulletin.

M-S-A METHANE TESTER TYPE M-6

New, small, streamlined instrument indicates methane concentrations as low as .2% in mine air. Pump is operated with the thumb while tester is held in palm of the hand. Edison Electric Cap Lamp battery provides dependable power. Unit conveniently connects and disconnects with battery. U.S. Bureau of Mines Approved. Write for bulletin.

M-S-A WOLF JUNIOR FLAME SAFETY LAMP

Light-weight aluminum construction and small size make inspection easier. This feature, combined with the easy-to-read standard size graduated chimney, assures utmost dependability in testing for methane and oxygen deficiency. Write for bulletin.

M-S-A METHANE RECORDER

Continuously charts methane concentrations in return air systems. This unit provides an accurate safety check against unusual gas conditions, and serves as a guide for regulating volume of air needed to *maintain adequate and economical ventilation standards.* In addition to recording methane content, this unit can be designed to give operating personnel visual and audible warnings of increasing or dangerous methane concentrations. Write for detailed bulletin.

MSA

SAFETY EQUIPMENT HEADQUARTERS

When you have a safety problem, M-S-A is at your service.
Our job is to help you.

MINE SAFETY APPLIANCES COMPANY

201 North Braddock Avenue, Pittsburgh 8, Pennsylvania

At your service: 76 Branch Offices in the United States

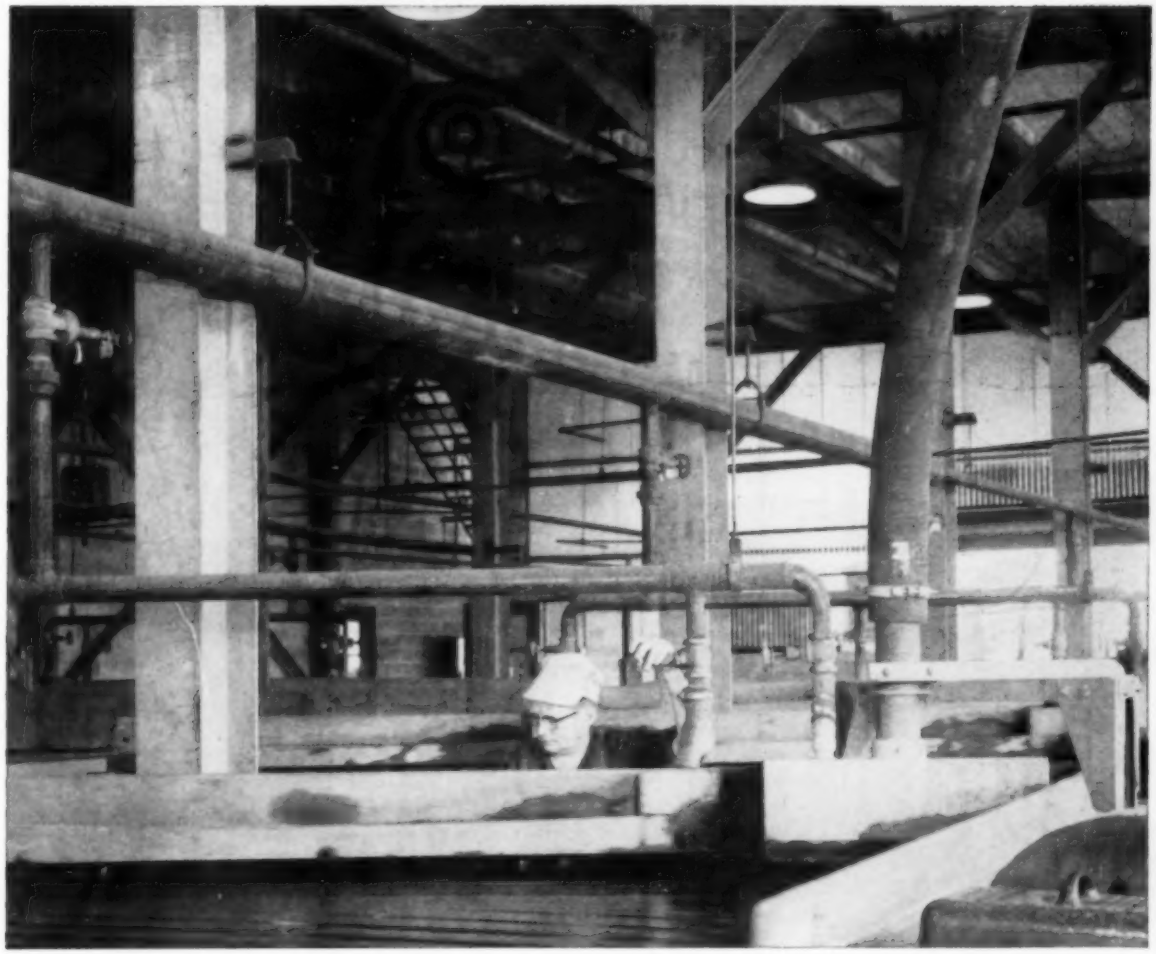
MINE SAFETY APPLIANCES CO. OF CANADA, LTD.

Toronto, Montreal, Calgary, Edmonton, Winnipeg, Vancouver, Sydney, N.S.

Representatives in Principal Cities in Mexico, Central and South America

Cable Address: "MINSAF" Pittsburgh

B.F.Goodrich



Hose swallows coal that's dug out of a river

A typical example of B. F. Goodrich improvement in rubber

FROM the bottom of a nearby river comes the coal used in an eastern power plant. The coal, along with silt, sand and water, is dredged from the river, and pumped into this building where the coal is separated.

But there was one trouble. A hose connected the pipe to the tanks you see in the picture. And the sharp, gritty particles were wearing right through the hose in only nine months.

Then a B. F. Goodrich man heard about the trouble, and suggested a new B. F. Goodrich hose with a special lining made of the toughest wear-resisting rubber known. Another hose just like this has even swallowed 10-pound chunks of iron ore without damage. So, in this power plant, after 18-hour-a-day use for over a year, the B. F. Goodrich hose is still in such good shape that engineers expect it to last another three years.

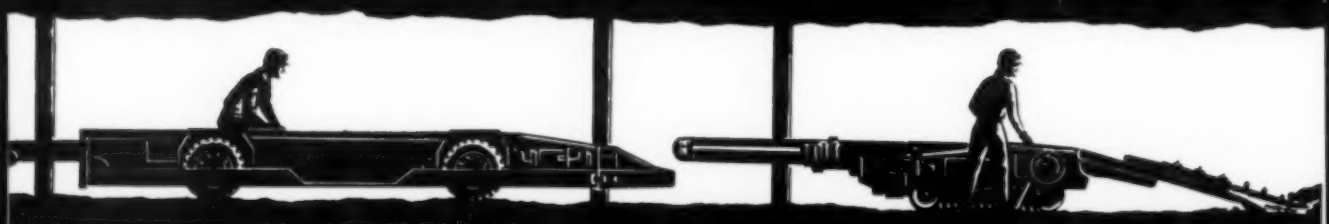
B. F. Goodrich has made hundreds of improvements in dozens of kinds of hose to make them last longer, cost less. Most improvements, while making the hose stand more abuse, have also made it more flexible and easier to handle. B. F. Goodrich makes hose to carry almost anything—air, water, gasoline, steam, chemicals, and even dry materials such as flour or cement. Your B. F. Goodrich distributor is an expert at solving hose problems. Call him when you need help, or write *B. F. Goodrich Industrial Products Company, Dept. M-798, Akron 18, Ohio.*

B.F.Goodrich

INDUSTRIAL PRODUCTS

NOW

...the most famous grease in the



Hulburt 8 AP Grease—

check these
Hulburt Firsts:

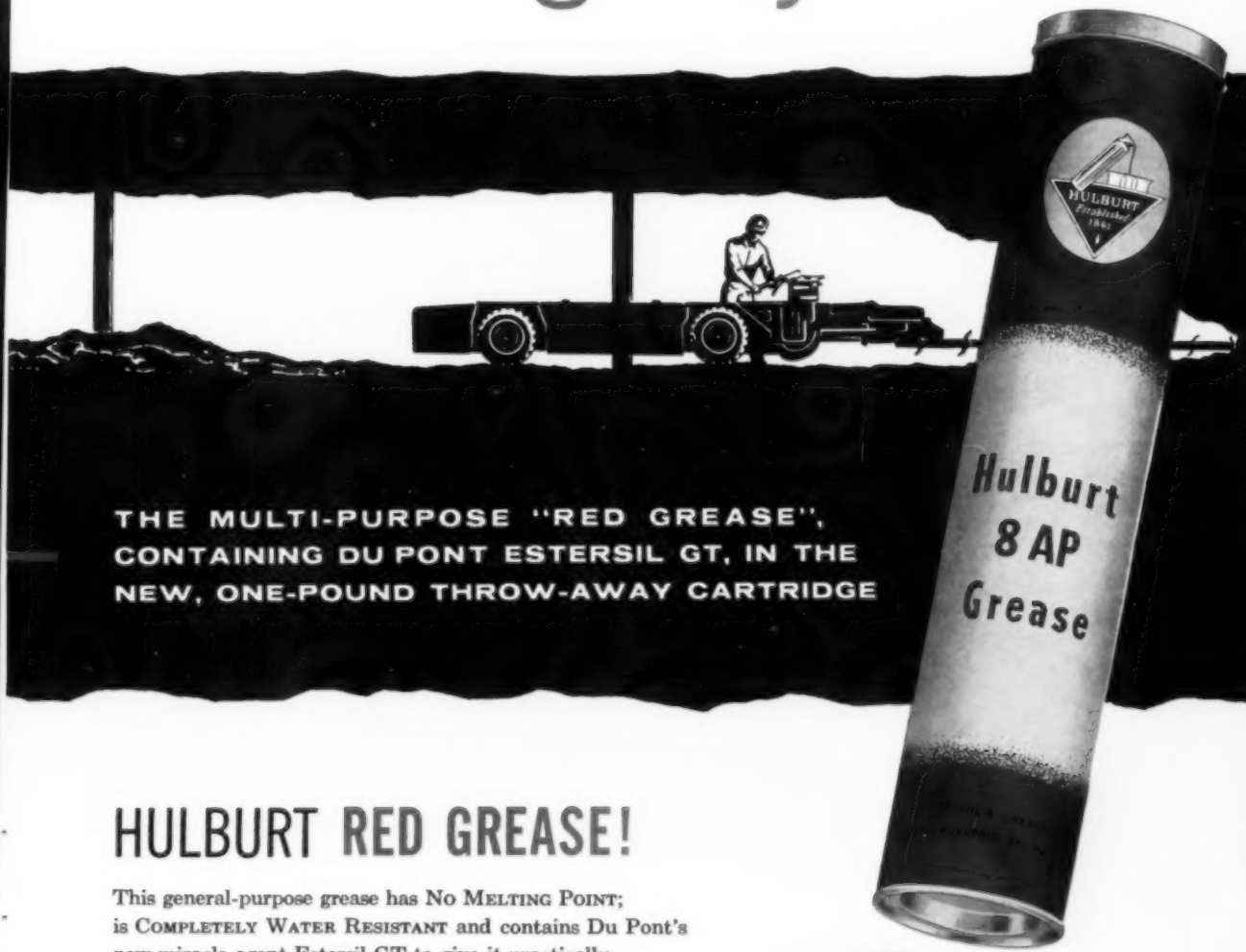
NO WASTE—The new Hulburt cartridge completely eliminates waste associated with refilling from a drum!

NO DIRT—Absolutely no dirt or other corrosive particles can mix with the sealed grease in the cartridge—before, during or after loading!

SAVES TIME—By keeping the easily carried Hulburt 10-pak carton at his side, he loads his gun in seconds and does not lose time returning to the drum supply!

Here, at last, is the fast, clean and thrifty way to keep your equipment in top operating condition. The new Hulburt throw-away cartridge not only saves you money by cutting handling time, waste and damage due to dirt, it also contains the best known and most widely acclaimed grease in the coal mining industry—

coal mining industry **right by his side!**



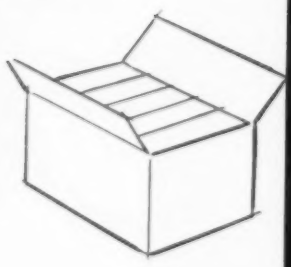
THE MULTI-PURPOSE "RED GREASE", CONTAINING DU PONT ESTERSIL GT, IN THE NEW, ONE-POUND THROW-AWAY CARTRIDGE

HULBURT RED GREASE!

This general-purpose grease has NO MELTING POINT; is COMPLETELY WATER RESISTANT and contains Du Pont's new miracle agent Estersil GT to give it practically unlimited durability.

Call your Hulburt representative today to get your greasing done the modern way.

The new Hulburt Grease Cartridges are available by the case, each containing FIVE handy carrying cartons with 10 one-pound cartridges per carton. *(Total: 50 cartridges per case.)*



Hulburt OIL AND GREASE COMPANY

Specialists in Quality Lubricants for the Coal Mining Industry

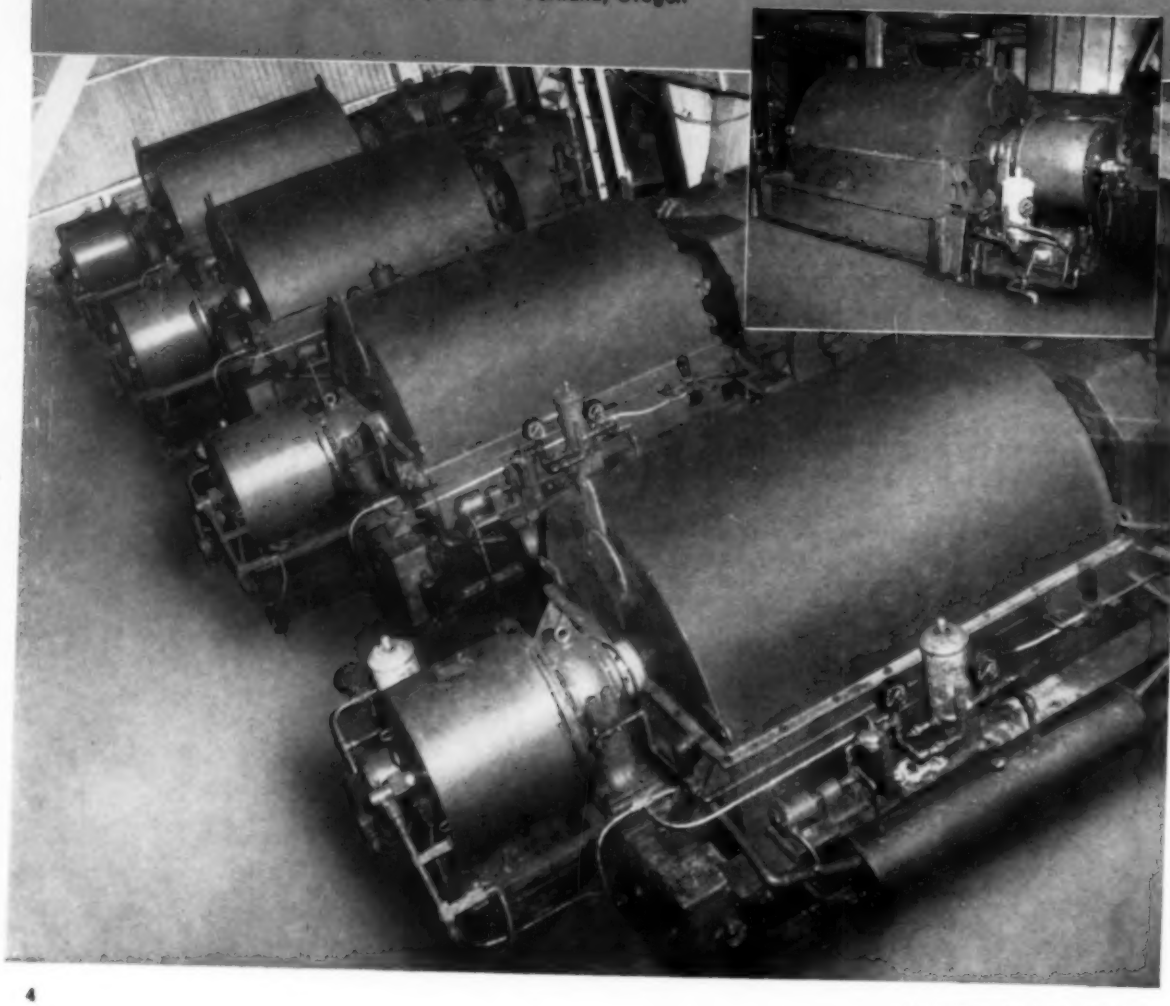
Trenton and Castor Avenues, Philadelphia 34, Pa.

AT UNITED STATES STEEL CORPORATION'S CORBIN, KENTUCKY PLANT these five Bird Coal Filters dewater pre-classified ¼" mesh coal as it comes from the wet tables. Each filter handles in excess of 60 tons per hour.

This is the way to dewater *your* fine coal. Ask us for recommendations, layouts, estimates.

BIRD MACHINE CO., South Walpole, Mass.

REGIONAL OFFICES: Evanston, Illinois • Portland, Oregon



Coal Age

NOVEMBER • 1956

Editorial: Worth Fostering 53

How John L. Lewis Sees It 54

Holding Top at the Face 58

Flexibility in Stripping 64

Rock Loaders and Extensible Belt Sink New Ireland Mine Slope 68

Low Cost Bank Reclamation 72

Safer Roof Bolting at Lower Cost 76

Rating Your Mine for Efficiency, Cost and Safety 78

The Reader Is Boss 81

Coal in Captive Europe 82

The Coal Commentator 88

Foreman's Forum:

Why Proper Handling of Grievances Is Important .. 90

Operating Ideas:

Adjustable Four-Arm Unit Drills Fast 94

Skid-Mounted Units Easily Moved 94

Chip Remover Saves Files 94

Jack Supports Dust Collector Cup 96

Revolving Door Eliminates Drafts 96

Tips on Hose Care 96

Equipment News Bulletin:

Ground-Fault Detector 100

Pocket-Size pH Meter 102

New Roundup 126

In this issue . . .

• Roof support quite likely will be a problem as long as men go underground to mine coal or any other mineral. Therefore, material on the subject appears rather frequently in *Coal Age*, witness the two articles in this issue. One analyzes roof and support characteristics as a guide to better matching of the two. The other shows how a specific mine is getting maximum results from its bolting program.

• John L. Lewis, at the convention of the United Mine Workers held early in October, in effect announced that he will continue as president of the union indefinitely. Thus, his ideas and feelings will continue to be matters of moment. What are those ideas and feelings? Some of them can be gathered from his convention speeches, which is why *Coal Age* presents the excerpts that start on p 54 of this issue.

In the works . . .

• What do you get into when you go to continuous mining? The list is a lengthy one all the way from power, dust and supplies to transportation. To help in planning for a successful operation, *Coal Age* will present a study of what to look at before and after you put the miners in to get the maximum in results.

• Also on the fire, a modern loading machine-operation with high tons per man . . . a new portal that really cuts cost . . . and a modern stripping operation with special features for handling overburden.

CARL COASH, Publisher — IVAN A. GIVEN, Editor

Harold Davis, Managing Editor — A. E. Flowers, Associate Editor — W. A. Raleigh, Jr., Assistant Editor

Christopher Elias, Assistant Editor — F. A. Zimmerli, Assistant Editor (layout) — G. B. Bryant, Jr., Washington

William H. McNeal, Research Manager — Raymond H. Smalley, Business Manager

COAL AGE — NOVEMBER, 1956
VOLUME 61 — NUMBER 11

(with which are combined The Colliery Engineer and Mines and Minerals)

Published monthly on the 1st, with an additional issue in Mid-July by McGraw-Hill Publishing Company, Inc. James H. McGraw (1860-1948), Founder. Member ABC and ABP.

Executive, Editorial and Advertising Offices: McGraw-Hill Building, 330 W. 42nd St., New York 36, N. Y. Publication Office, 1309 Noble St., Philadelphia 23, Pa. Donald C. McGraw, President; Paul Montgomery, Executive Vice President; Joseph A. Gerardi, Executive Vice President and Treasurer; Hugh J. Kelly, Executive Vice President; John J. Cooke, secretary; Nelson Bond, Executive Vice President Publications Division; Ralph B. Smith, Vice President and Editorial Director; Joseph H. Allen, Vice President and Director of Advertising Sales; J. E. Blackburn, Jr., Vice President and Circulation Director.

Subscription: Address all correspondence to COAL AGE—Subscription Service, 330 W. 42nd St., New York 36, N. Y.

A McGRAW-HILL PUBLICATION

Member of Associated Business Publications and Audit Bureau of Circulations

Allow 1 month for change of address. Subscriptions are solicited only from management, production and maintenance executives and engineers in the coal mining industry. Position and company connection must be indicated on subscription orders.

Single Copies: U. S. and possessions and Canada: 60c; all other countries, $1.50.

Subscription rates: United States and possessions and Canada, $3 for one year, $4 for two years, $5 for three years.

Other Western Hemisphere and the Philippines, $10 for one year, $16 for two years, $20 for three years. All other countries, $15 for one year, $25 for two years, $30 for three years.

Entered as second class matter May 4, 1951, at the Post Office, Philadelphia, Pa., under the Act of March 3, 1879. Printed in U.S.A.

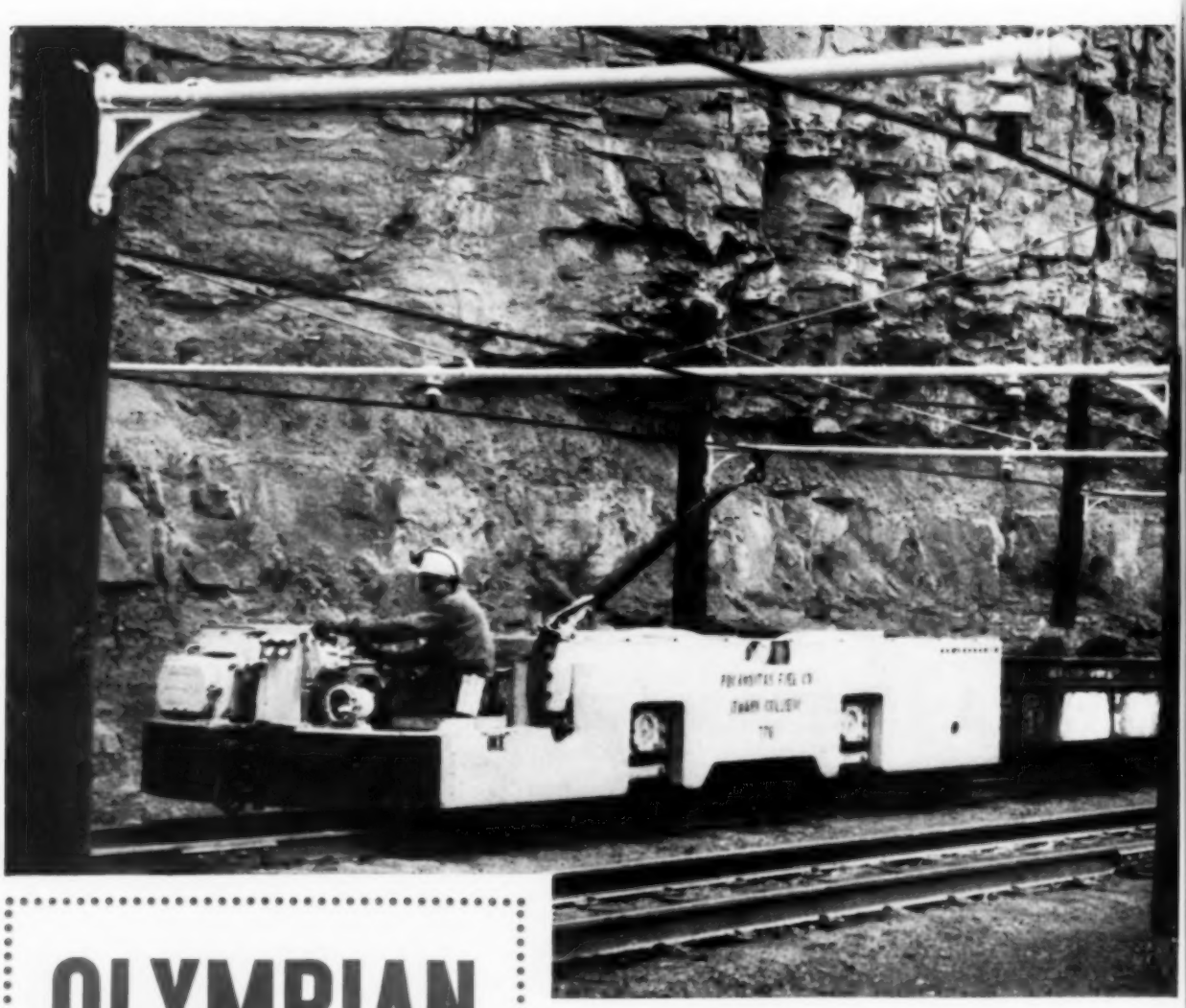
Contents Copyright 1956 by McGraw-Hill Publishing Co., Inc.—All rights reserved.

COAL AGE articles are indexed regularly by Engineering Index, Inc., COAL AGE's own index is published annually in December.

Branch Offices and District Managers: Atlanta 3, M. H. Miller; Chicago 11, F. W. Roets and G. A. Mack; Cleveland 15, J. E. Lange; Dallas 1, G. L. Jones, Jr., D. C. Billian; Los Angeles 17, P. S. Carberry; New York 36, H. C. Chellson, J. W. Patten (New Eng.); Philadelphia 3, J. B. Lewis; Pittsburgh 22, W. H. H. Ginder; San Francisco 4, J. W. Otterson; Washington 4; London E.C. 4, McGraw-Hill House, 95 Farringdon St., H. Legler.

News Bureau Offices: Atlanta 3; Cleveland 15; Detroit 26; Houston 25; San Francisco 4; Washington 4.

World News Offices: London, Paris, Bonn, Tokyo, Beirut, Rio de Janeiro, Mexico City.

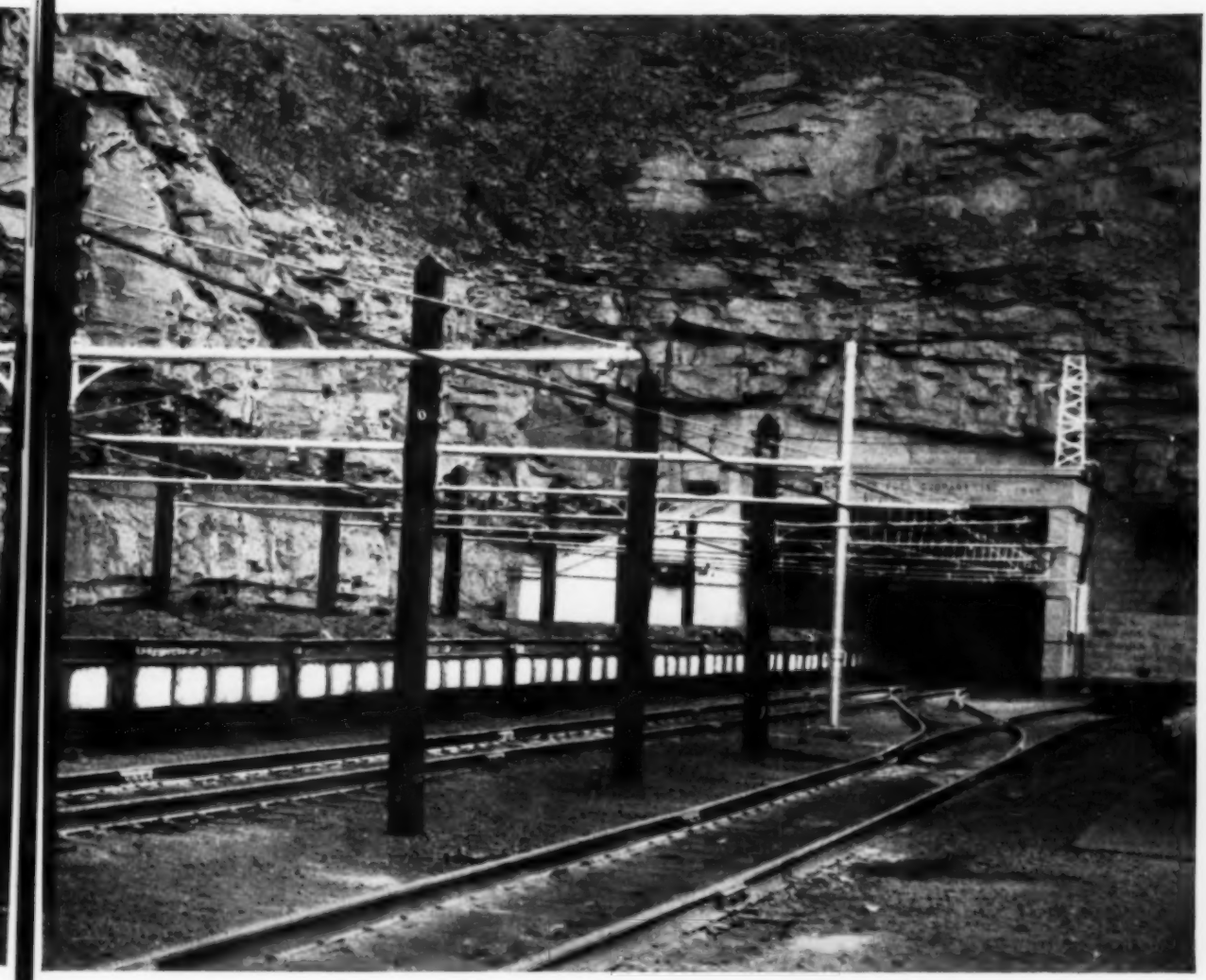


OLYMPIAN
makes starting... and saving... easier

LUBRICATE car wheels with *Texaco Olympian Grease* and you'll get quick, easy starts every time. This fine lubricant resists stiffening even at severe winter temperatures. It keeps maintenance costs down, too. Here's why:

Texaco Olympian Grease is made specifically to protect wheel bearings against dirt, moisture and wear—at any temperature. And this is *longer lasting* protection, because *Texaco Olympian*

TEXACO



Grease stays in the bearings under all conditions. Moreover, it effectively resists oxidation, will not separate in service or storage.

Texaco Olympian Grease is available in three consistencies—to fill every requirement of plain, cavity hub or anti-friction bearings.

For all high-speed anti-friction and sleeve bearings in locomotives, motors, cutters and other equipment — use *Texaco Multifak*. This multi-purpose grease has high resistance to oxidation and water — plus exceptional stability. Use it—you'll simplify lubrication, reduce costs.

Let a Texaco Lubrication Engineer help improve and economize your operation. Just call the nearest of the more than 2,000 Texaco Distributing Plants in the 48 States, or write:

The Texas Company, 135 East 42nd Street, New York 17, N.Y.

LUBRICANTS for the Coal Mining Industry

ALLIS-CHALMERS HD-21

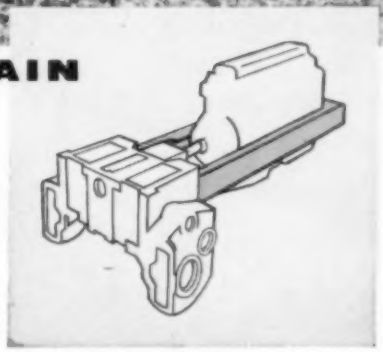
Engineered to take

the Strain, the Shock,

and the Grind

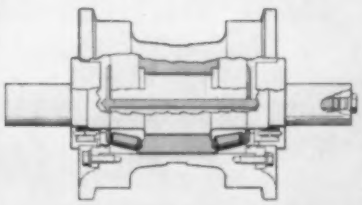
of Modern Mining Methods

THE STRAIN



You encounter frame-twisting stress as you punch haul roads through rough, rocky terrain. Jobs like this prove the value of Allis-Chalmers exclusive all-steel, box-A main frame. It is strong and flexible . . . soaks up vertical, horizontal and torsional strains. It is a complete unit . . . does *not* use the engine as a structural member. In addition, it allows more efficient equipment mounting, provides excellent weight distribution and makes possible unit construction for unmatched servicing ease.

A crawler tractor must handle many different jobs in a mining operation . . . and every job tests its durability in a different way. Let's see how Allis-Chalmers engineers have anticipated these demanding conditions . . . and have designed the HD-21 to meet them.



THE GRIND

These tracks churn all day in fine, abrasive stone . . . could be a serious threat to final drive, idler, truck wheel and support roller bearings. But this "grinding compound" never reaches the bearings on an Allis-Chalmers tractor. Exclusive design features make it possible to use tapered roller bearings with *positive* seals that keep dirt and moisture out and hold lubrication in for at least 1,000 hours without lubricating attention.

THE SHOCK

Sudden overloads are common in dozer operations around a mine. But hydraulic torque converter drive cushions the shock and protects the entire power train. This drive is standard equipment on the HD-21 and has been *proved* on Allis-Chalmers tractors since 1940.

HD-21

Approx. Weight (as illustrated)
with hydraulic bulldozer 51,265 lb
with cable bulldozer 52,650 lb
204 net engine hp

Ask your Allis-Chalmers Construction Machinery dealer to show you the many other ways the HD-21 has been designed with your tough problems in mind.

ALLIS-CHALMERS, CONSTRUCTION MACHINERY DIVISION, MILWAUKEE 1, WISCONSIN

ALLIS-CHALMERS

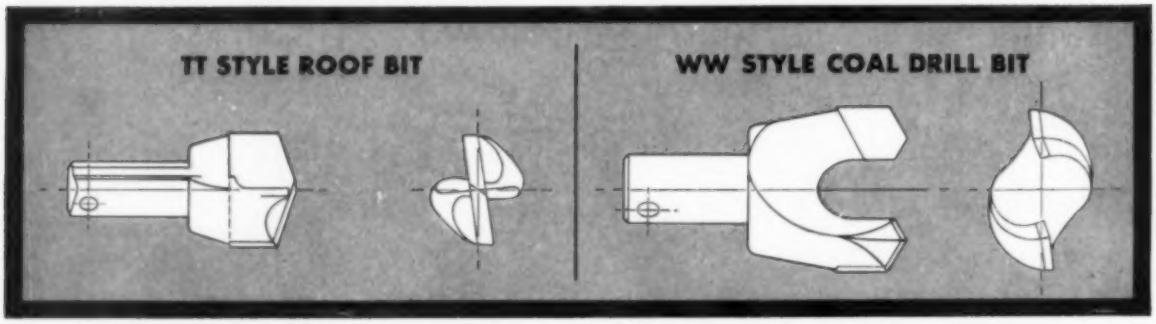
2 NEW MINING TOOL BITS

with the Strength and Wear Resistance to tackle the most rugged jobs

Latest additions to the proven line of Carmet bits are the WW Style coal drill bit and the TT Style roof drill bit.

Both types have been newly designed for faster penetration and greatly increased tool bit life.

Heavier alloy steel backing on the shanks provides support for a harder, more wear resistant grade of carbide tip. Longer wear length along the cutting edge permits full use of all the carbide before discarding the tool.



CARMET DISTRIBUTORS

Persinger Supply Co., Williamson, W. Va.
Persinger's Inc., Charleston, W. Va.
Leechburg Supply Co., Leechburg, Pa.
Oglebay, Norton & Co., St. Clairsville, Ohio
Drillmaster Supply & Mfg. Co., Evansville, Ind.
Crandall Engineering Co., Inc., Birmingham, Ala.
Carbon Transfer & Supply Co., Helper, Utah
Carlsbad Supply Co., Carlsbad, New Mexico
McCombs Supply Co., Jellico, Tenn.
Union Supply Co., Denver, Colorado
Consolidated Supply Co., Picher, Okla.
W. B. Thompson Co., Iron Mountain, Mich.

★ ★ ★

Get in touch with the Distributor nearest you.

Extensive tests have proved the ability of the TT Style roof drill bit to penetrate the most rugged formations without premature massive tip fracture or excessive wear. Full feed pressures can be used on the heaviest duty roof bolters for greater production and economy of operation.

The new design of the WW Style coal drill bit allows faster penetration and easier cutting either in hand-held or power-fed drills. This bit is designed with a wide scoop for quick, easy removal of loose cuttings. Proper gage is maintained through the life of the tool, which field tests show to be double that of any competitive bit.

Allegheny Ludlum Steel Corporation, Carmet Division, Wanda and Jarvis Avenues, Detroit 20, Mich.

The Original DOUBLE-BONDED Carbide Bit

CARMET®

WSW 6116 B

STANOLITH Grease gives coal a smooth ride

Over 5,000 bearings need just one grease. Never a bearing lubrication failure.

Part of the coal for the Wabash River Generating Station operated by the Public Service Co. of Indiana near Terre Haute, comes directly from the Viking Coal Mine Processing Plant via a conveyor system. The system operates 365 days a year moving up to 4,800 tons of coal per day. STANOLITH Grease has been used to lubricate all bearings in the conveyor system since February 3, 1953, the start up day. In all that time there has never been a bearing lubrication failure.

Prior to the initial operation of the conveyor system, maintenance supervisors checked with Paul Manning, Standard Oil industrial lubrication specialist, about lubricating the new installation. Paul, they knew, has extensive experience (21 years) in handling lubrication problems of this kind. Working with plant management, Paul recommended STANOLITH Grease No. 42 for the job. STANOLITH Grease has fulfilled maximum expectations.

STANOLITH Grease is a smooth textured grease. It is made from highest quality oil, lithium soap and special additives. It resists water washing and water contamination. STANOLITH Grease works well in exposed, outdoor installations. It will not channel. It is chemically stable. It can be applied easily by hand, gun or pressure system.

Find out more about STANOLITH Grease. Talk to your Standard Oil industrial lubrication specialist. There is one near you in any of the 15 Midwest or Rocky Mountain states. Or write 910 South Michigan Avenue, Chicago 80, Illinois.

***Quick facts about* STANOLITH Grease**

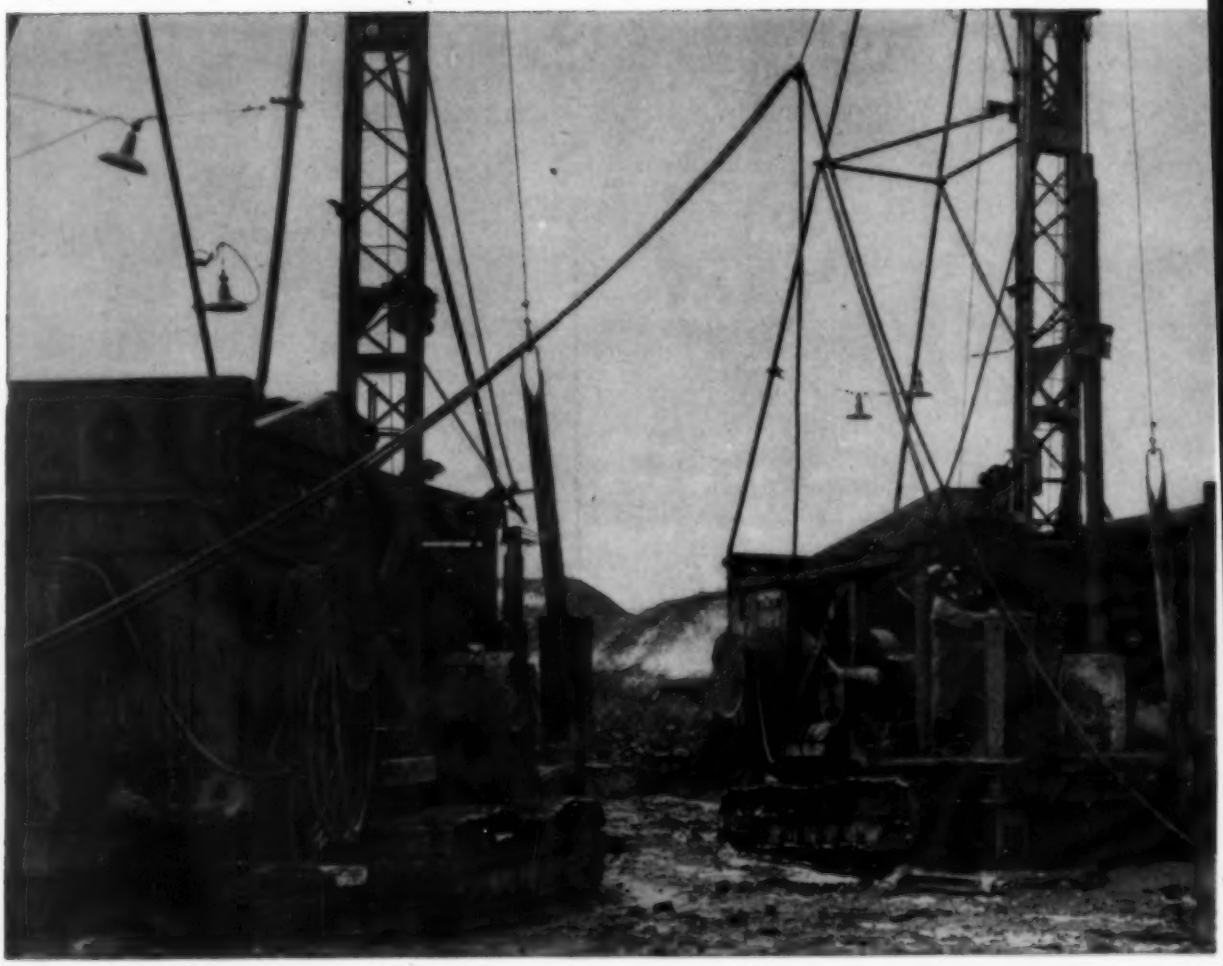
- Water resistant
- High temperature resistant
- Pumpable in grease gun or pressure system
- Mechanically stable

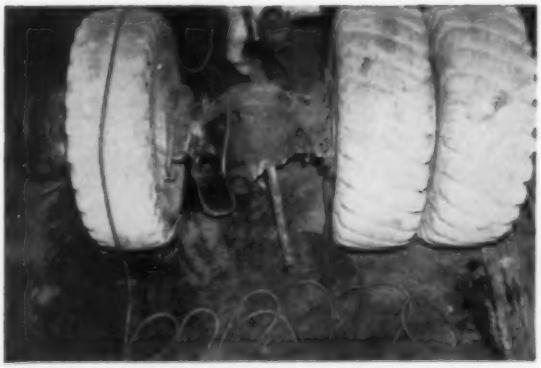
STANDARD

STANDARD OIL COMPANY
(Indiana)

Part of coal conveyor system at Wabash Power Plant, Terre Haute. Entire conveyor is lubricated with one grease —STANOLITH. No bearing failures experienced during the 3½ years conveyor has operated.

Tiger Brand Amerclad
in this

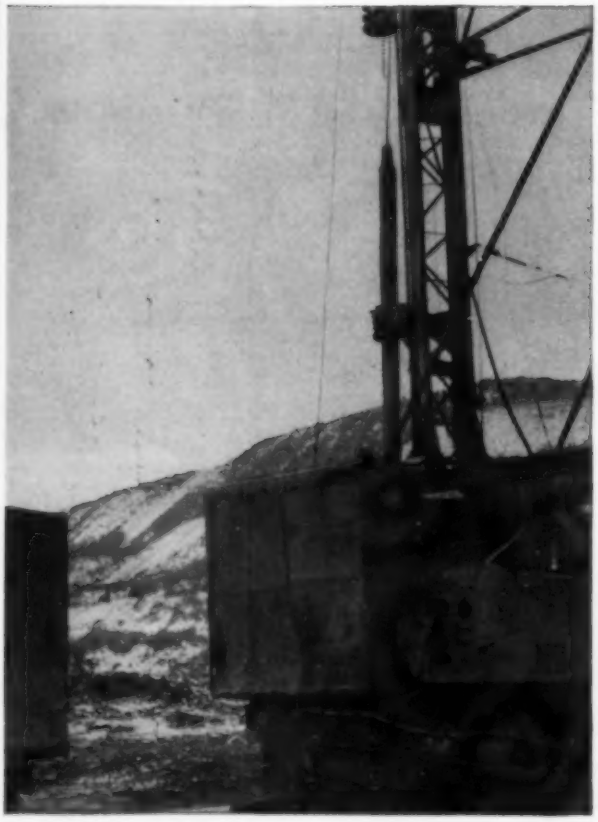




Extra flexible welding cable is shown. Fine stranded construction eases strain on operators' wrists.

Notice the flexibility. Tiger Brand is easy to handle.

does the three big jobs high production strip mine



Imagine the worst possible environment for electrical cable, and you'll find it at the strip mine shown in these pictures. The operators are plagued with underground fires, so severe that they have ruined the plastic windows in some of the power shovels. The rocks get so hot that you can't touch them or walk on them.

Despite the heat, the Tiger Brand Amerclad cable lies on the ground day in and day out, delivering dependable power 21¾ hours every day.

They do a lot of blasting at this mine, too. Although they try to protect the cable, it is pounded by large, sharp rocks almost every time there is a blast. Yet, when the pictures were taken, all the original cable was still in use, after *12 solid years of service.*

The mine owners point out that when a cable fails it costs money in down-time and replacement. The clincher is this: every foot of shovel cable, welding cable and drilling cable in the mine is Tiger Brand Amerclad.

Roughhouse service. That cable slung in the air and coiled on the sides of the drills is all Tiger Brand Amerclad.

AMERICAN STEEL & WIRE DIVISION, UNITED STATES STEEL
GENERAL OFFICES: CLEVELAND, OHIO

COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO, PACIFIC COAST DISTRIBUTORS
TENNESSEE COAL & IRON DIVISION, FAIRFIELD, ALA., SOUTHERN DISTRIBUTORS
UNITED STATES STEEL EXPORT COMPANY, NEW YORK

A STANDARD TIGER BRAND CABLE FOR EVERY SPECIAL JOB

- asbestos wire and cable
- paper & varnished cambric cable
- mold cured portable cord
- machine tool & building wire
- shovel & dredge cable
- special purpose wire & cable
- aerial, underground and submarine cable

USS Tiger Brand **ELECTRICAL WIRE & CABLE**

UNITED STATES STEEL

Here's ready-to-use coal-stripping on International®

FROM ALABAMA:

"Planet Power steering increases production—adds safety"

On this large coal-stripping operation near Peterson, Alabama, 20 to 40 feet of earth-sand-gravel, and blue shale overburden is removed—approximately 50% of it with crawler tractor power.

The International TD-24 moves an estimated 4,000 cu yd of earth-sand-gravel overburden per 10 hours, on the average 100-foot push.

"We are well pleased with our TD-24's," states A. S. Bowen, for Bowen Construction Company, Birmingham, with the authority of 7 years of TD-24 experience. "The TD-24 is the best cutting dozer we've ever used. The 2-speed (Planet Power) steering is a great advantage for rough terrain operation, which means increased production and added operator safety."

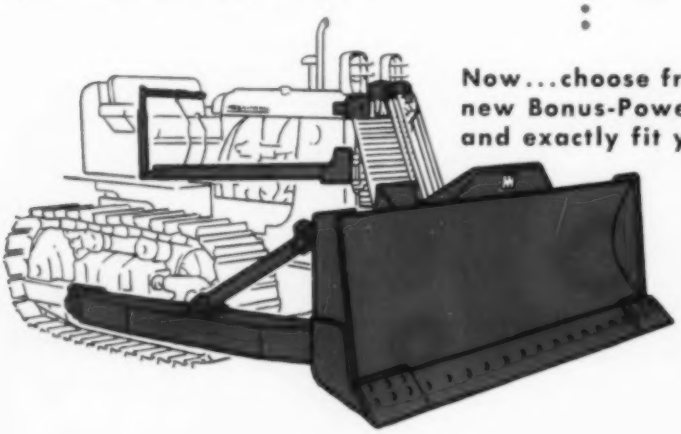
FROM WEST VIRGINIA:

"The TD-24 is built to take our hard work"

"We've owned seven International TD-24's since 1948," reports A & P Mining Company, Enterprise, West Virginia. "With this model, excessive track wear is a thing of the past. Our work is hard and the TD-24 is built to take it. We are well pleased because these machines are dependable, continuous producers."

One of the mining company's two TD-24's is shown operating under typical bituminous stripping conditions in the Jones Run area near Clarksburg.

Pushing cable tilt dozers, the crawlers are teamed with a 3-yard shovel to strip off an overburden of shale, limestone, and earth—averaging 70 feet. Operation is uncovering the 6 to 7-foot vein known as the Pittsburg seam, being mined for the electric utility market.



Now...choose from 42 new blades...to match your new Bonus-Powered International crawler and exactly fit your coal-stripping needs!

See for yourself how exclusive International TD-24 Planet Power steering eliminates the "load-limiting drag" of ordinary big crawler steering. Try such time-saving TD-24 features as the positive-locking hydraulic track adjuster. Measure how an International Drott 4-in-1 Skid-Shovel (1-yd to 3-yd capacity) can beat a fleet of limited-duty rigs, on your spread. See your nearby International Construction Equipment distributor for a demonstration!

experience from four states
TD-24 advantages

FROM KENTUCKY:

"Full-time live power on both TD-24 tracks ideal for highwalling"

"TD-24 Planet Power steering, giving full-time live power on both tracks, makes it an ideal highwall crawler. During our first 2,200 working hours on the TD-24 we had no downtime.

"Work capacity, operating ease, low upkeep, and dealer service are why we are using International crawlers," declares partner Maloy Mullins, of Mullins and Mullins Coal Co., Pikesville, Ky.

"Our TD-9 Drott Skid-Shovel loads out over 434 tons of coal in 7¼ hours—besides maintaining haul road and doing clean up. Takes only 15 minutes to change from bucket to angle blade."

Picture shows the Mullins' TD-24 stripping earth-shale overburden from the Elkhorn No. 2 seam.

FROM TENNESSEE:

"Upkeep economy, big production are my reasons"

Howard Coal Company, Caryville, Tennessee, uncovers the 5½-foot Rock Springs seam—removing 25 to 50 feet of earth and rock overburden with International TD-24 crawler and power shovel.

In addition, an International Drott TD-14 Skid Shovel loads out the coal at the rate of 12 tons in 3 to 4 minutes. This unit also applies exclusive pry-over-shoe break-out action for tough excavating beyond a boom-type shovel's reach.

Says partner Lee Powers, for the Howard Company: "I use International crawlers for low upkeep, and because they are power-and-traction matched to increase production. Pry-action and bucket roll-back of the Drott Skid-Shovel give work-speeding digging force."

INTERNATIONAL HARVESTER

INTERNATIONAL® Construction Equipment

International Harvester Company, 180 N. Michigan Avenue, Chicago 1, Illinois

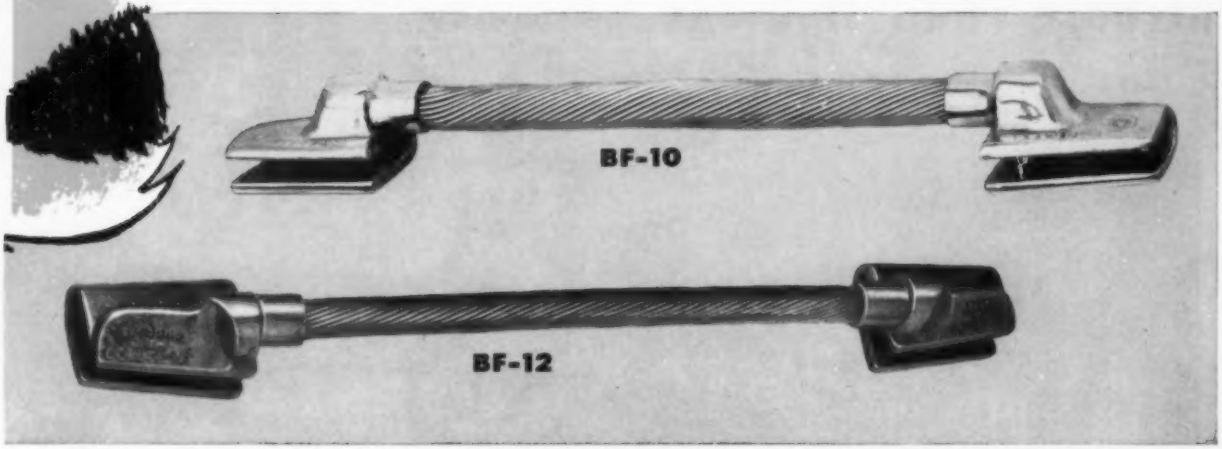
A COMPLETE POWER PACKAGE INCLUDING: Crawler, Wheel, and Pipe-Boom Tractors . . . Self-Propelled Scrapers and Bottom-Dumps . . . Crawler and Rubber-Tired Loaders . . . Off-Highway Trucks . . . Diesel and Carbureted Engines . . . Motor Trucks

YOU TAKES YOUR CHOICE WITH TIGERWELD!

A good rail bond for every purpose

Take the Tigerweld BF-10 and Tigerweld BF-12 Rail Bonds, for example. Both are extremely rugged, extremely reliable. Both are easy to install. Both have heavy steel self-clamping terminals that hold themselves on the rail while you weld. Both are fastened with a strong steel-to-steel weld. Both have the strand permanently butt-welded to the terminals. The one important difference: the BF-12 has a raised shoulder that allows you to lay on more weld metal and get a stronger joint.

And this one difference is enough to make some customers prefer the BF-12, while others prefer the BF-10. So we make both, and everybody's happy. Everyone gets just the type of bond he wants. You will find Tigerweld Bonds for bootlegs. Tigerweld Bonds for splice bars. Tigerweld Bonds for cross-bonding. Tigerweld Bonds for temporary trackage. Tigerweld Bonds for permanent trackage. Write, or call the nearest sales office of American Steel & Wire to fill *any* bonding requirement.



USS **TIGERWELD** RAIL BONDS

AMERICAN STEEL & WIRE DIVISION, UNITED STATES STEEL, GENERAL OFFICES: CLEVELAND, OHIO
COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO, PACIFIC COAST DISTRIBUTORS • TENNESSEE COAL & IRON DIVISION, FAIRFIELD, ALA., SOUTHERN DISTRIBUTORS
UNITED STATES STEEL EXPORT COMPANY, NEW YORK

UNITED STATES STEEL

Coal's bright future — a prospective output of 600 million tons by 1960 — calls for larger haulage ways in many mines.

Here we see a Le Roi-Cleveland airleg and drill enlarging a haulage way. This airleg unit makes drilling much easier for miners because it supports the machine and feeds it into the rock at the same time. Eleven feed positions provide the proper feeding action for the material being drilled.

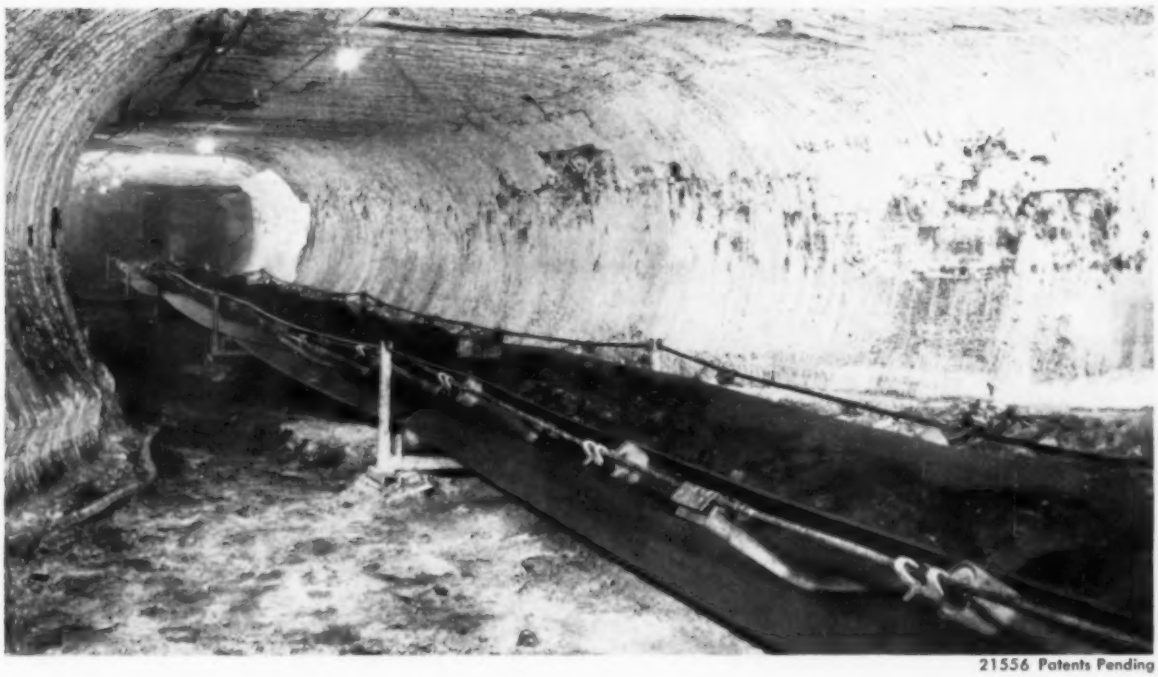
How Air Tools Help Coal Mines to Increase Their Haulage Capacity

by Le Roi-Cleveland

A simple way to take up bottom. When you have only a few holes to drill, a Le Roi-Cleveland H10 riding a plank provides a practical method of drilling toe holes. The machine you see here was detached from its airleg. Its cylinder contour is such that it rides a plank perfectly. When this job is over, the drill can be attached to its airleg in a few seconds and is then ready for other drilling jobs.

Taking up bottom on a production basis. The Le Roi-Cleveland Model DR34 Light Wagon Drill is ideal for this type of work. It has the mobility — is easy to move around. It has the flexibility — drills toe holes or flat holes 7½ feet above ground level, with all adjustments being made by air motor. It permits the use of more powerful drills for faster drilling and deeper holes.

LE ROI Division of Westinghouse Air Brake Co., Milwaukee 1, Wisconsin, manufacturers of Cleveland air tools, Tractair, portable and stationary air compressors, and heavy-duty industrial engines. Write us for information on any of these products.



21556 Patents Pending

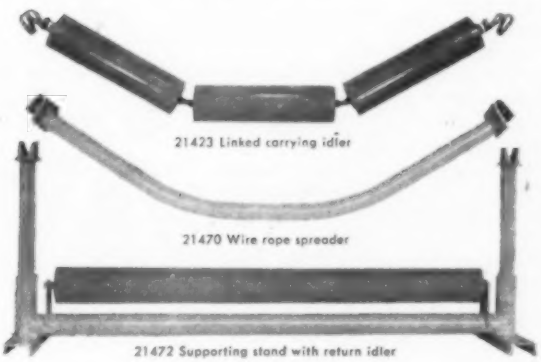
You win all-ways with the new GOODMAN *Rope Belt** CONVEYOR

Easier Handling:

By eliminating practically everything but the belt itself and the terminal sections, hours have been chopped off installation and extension time. For example, the Rope Belt can be extended 150 feet in less than one hour between shifts, with no loss in production time. All necessary parts can be hauled in one mine car or shuttle car with room to spare.

Improved Haulage Capacity:

Hinged action of the linked idlers and spring action of the parallel ropes "cup" the belt to the load, provide shock-free travel without shifting and without spillage. One mine superintendent reports 4500 tons per shift on a 500 foot 42" Rope Belt running at 600 fpm. And this is not at all unusual.



No tools are needed to add these parts to conveyor line. There is no framing that requires positioning for hooking or bolting together.

Lower Maintenance Costs:

Shock-free operation means less wear and tear on belt and idlers . . . fewer repairs . . infrequent replacement An added bonus from the standpoint of wear and attention required is the constant alignment of ropes between anchor points and the belt aligning influence exerted by each linked idler assembly.

These time saving, money saving facts are based on actual operating experience. They show why a Goodman Rope Belt Conveyor quickly pays for itself in light or heavy duty service. Want more details? Write us today.

*Trade Mark

GOODMAN
MANUFACTURING COMPANY
Halsted Street and 48th Place, Chicago 9, Illinois

CUTTING MACHINES • CONVEYORS • LOADERS
SHUTTLE CARS • LOCOMOTIVES • CONTINUOUS MINERS

Use Genuine Goodman Replacement Parts

In cramped quarters like this, Tournapull Rear-Dump turns in dump position, which moves rear wheels forward for extremely short wheel-base. With bowl raised, 22-ton capacity C Tournapull, shown, turns 180° in only 20' 8" wide area, without backing.

Short 180° turns

boost pit output, cut handling costs

If you are interested in cutting cycle time on your pit hauls, consider Tournapull Rear-Dumps.

These high-production units are extremely maneuverable, can back into a shovel or restricted dump area faster than any haulers on the market. They make 180° turns by power steer thru geared king-pin in less than their own length. They eliminate time normally wasted maneuvering back and forth to turn in narrow quarters. They also frequently eliminate expense involved in construction of skid-plates or special turn-around areas.

Even where space is unlimited, rig's 90° prime-mover-turn gives you faster cycles. At the shovel, fast-maneuvering Tournapull Rear-Dump swings in and positions in 1 quick move. Loading unit need not sit idle while hauler operator wastes time on a wide sweeping turn, and a long, slow back-in. Quick, safe spotting saves additional production time at grizzly or dump.

Simplicity reduces maintenance

A great deal of your usual maintenance expense is also eliminated because of the simplicity of Tournapull's turn mechanism. Steering involves only an electric motor, connected to a rugged ring gear king-pin shaft. A flick of operator's finger activates motor . . . causes prime-mover to pivot up to 90° around trailing unit. Turns are made quickly, regardless of footing. There are no front steering knuckles, no reach rods, no complicated mechanisms to get out of line, maintain, or repair.

Check these, and all the other advantages of Tournapull Rear-Dumps. See for yourself how they speed haul cycles and cut costs. Write or call, any time, for owner-verified production studies and specifications. There's no obligation.

Model	Capacity	HP	Overall Length	Width req'd. for 180° turn	
				Travel position	Dump position
D	11 tons	138	24'10"	24'8"	18'8"
C	22 tons	208	29'9"	28'8"	20'8"
B	35 tons	293	35'10"	35'	27'

These features, too, cut your hauling costs

Hauls anywhere—Travels safely over narrow haul roads, paved highways, city streets . . . hauls cross-country over terrain, thru muck, rock, and soft fill.

Dumps fast, clean — Electric motor lifts body quickly to any desired dump angle . . . bowl tips behind rear wheels for clean over-bank spill. Streamlined body sheds material readily.

Cuts weather delays — Power-transfer differential applies extra power to wheel on firmest footing . . . pulls rig through mud, sand, soft materials.

Rugged body loads easily — Big bowl opening is easy loading target. Three layer, *all-steel* bowl with tool-steel floor resists wear and shock. Available with optional tailgate.

Improves safety — More than 4 times the braking surface of ordinary haulers plus optional electrotarder, low center of gravity, excellent visibility, front-wheel drive, easy control, all contribute to maximum safety.

Reduces fatigue — Big tires and air-foam cushioned seat smooth out ride for operator. Electric power steer and 2-way power dump make work easy.

Insures future earnings — Behind basic prime-mover you can interchange other trail units: scraper, bottom-dump, lift-and-carry crane, logging-arch, flat-bed hauler. Keeps your Tournapull busy at a profit all year-around.

Tournapull—Trademark Reg. U.S. Pat. Off. R-1168-M-b

LeTourneau-WESTINGHOUSE Company, PEORIA, ILLINOIS

A Subsidiary of Westinghouse Air Brake Company

ARBA

See you at the ROAD SHOW • Chicago • January 28-February 2, 1957

Neoprene-jacketed cable survives avalanche

The proven toughness and durability of neoprene make it ideal for conveyor belting

Thousands of tons of jagged rock crashed down and buried more than 500 feet of the shovel cable shown above. Giant rock fragments pinched and crushed it, but failed to cut the tough neoprene jacket. Power was uninterrupted. Your conveyor belt may never contend with an avalanche, but proven toughness and durability like this means your neoprene belt will stand up through years of service.

You'll like the way a neoprene belt takes mechanical abuse, and you'll find it handles coal just like an ordinary belt. Upgrade, coal has no greater tendency to slide. In cold weather, neoprene stiffens no more than natural rubber. Neoprene has about the same friction on a drive pulley—requires no more tension or power.

Operating characteristics are about the same, yet neoprene offers outstanding resistance to factors that attack ordinary belts... oil, grease, weathering and mildew. And neoprene belting is fire-resistant—eliminates the possibility of a belt fire sweeping through your mine.

You'll find neoprene belts are a profitable investment—reducing downtime for maintenance, offering longer service life and added safety. Next time you buy a belt, specify a neoprene cover. Your supplier can give you full details.

FREE! THE NEOPRENE NOTEBOOK.
Every issue contains new illustrated case histories, interesting articles, new applications of neoprene. Clip and mail this coupon to E. I. du Pont de Nemours & Co. (Inc.), Elastomers Division CO-11, Wilmington 98, Delaware.

NEOPRENE
The rubber made by Du Pont since 1932

DU PONT
REG. U.S. PAT. OFF.

BETTER THINGS FOR BETTER LIVING... *THROUGH CHEMISTRY*

E. I. du Pont de Nemours & Co. (Inc.)
Elastomers Division CO-11
Wilmington 98, Delaware

*Name*_____ *Position*_____

*Firm*_____

*Address*_____

*City*_____ *State*_____

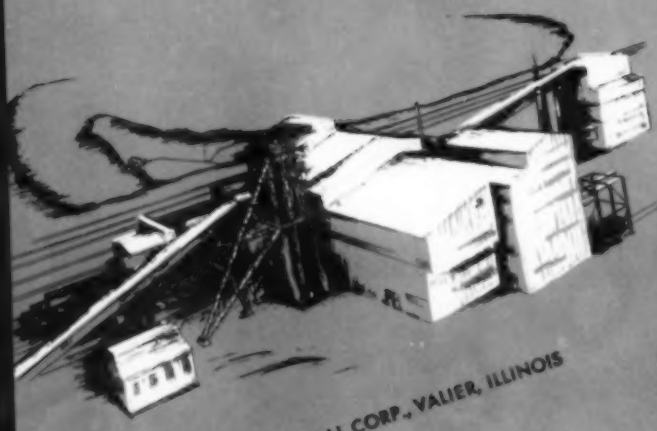
WHEREVER YOUR FIELD...WHATEVER YOUR PRODUCT RANGE

There is a proved McNALLY TROMP DENSE MEDIA PLANT

Engineered to Serve Your Market

SEMINOLE COAL CORP., LENZBURG, ILLINOIS

BADGER COAL CO., PHILIPPI, WEST VIRGINIA

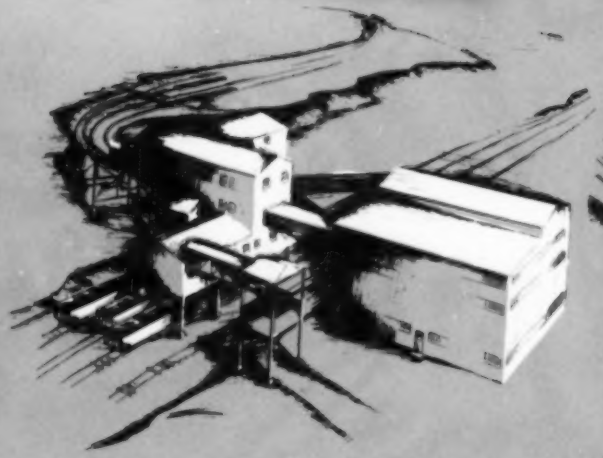


OLD BEN COAL CORP., VALIER, ILLINOIS

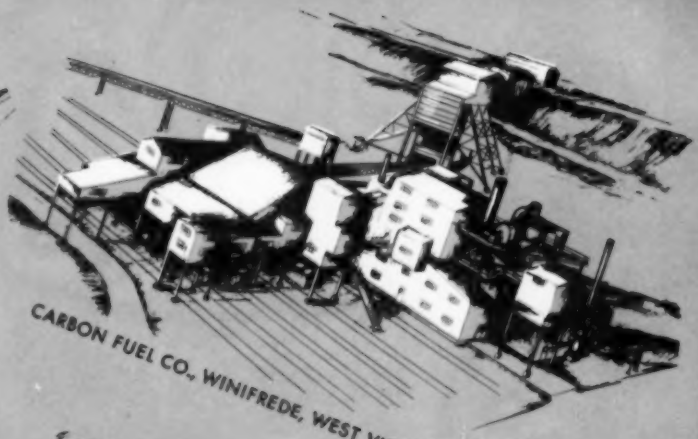
REPUBLIC STEEL CORP., BIRMINGHAM, ALABAMA

BLUE DIAMOND COAL CO.
TILFORD, KENTUCKY

USIBELLI COAL MINES, INC., SUNTRANA, ALASKA



EASTERN COAL CORP., McANDREWS, KENTUCKY



CARBON FUEL CO., WINIFREDE, WEST VIRGINIA

ETHEL CHILTON MINES, INC., ETHEL, WEST VIRGINIA

ROSLYN CASCADE COAL CO., RONALD, WASHINGTON

MANUFACTURERS OF EQUIPMENT TO MAKE COAL A BETTER FUEL

McN P

From Alaska to Alabama, wherever there is coal, there are McNally Tromp installations. These proved Dense Media Plants are serving the needs of their markets, producing a better product, faster, and at lower costs.

You, too, can meet and beat today's competition when you take advantage of McNally Pittsburg's broad experience. Here you will find the most extensive range of engineering skills and most complete manufacturing facilities. We can supply your every coal preparation need from the ground up—at this "one-stop service" long recognized for its highest type of manufacturing and engineering ethics.

If you are in need of anything from replacement parts to a complete plant, write today for information.

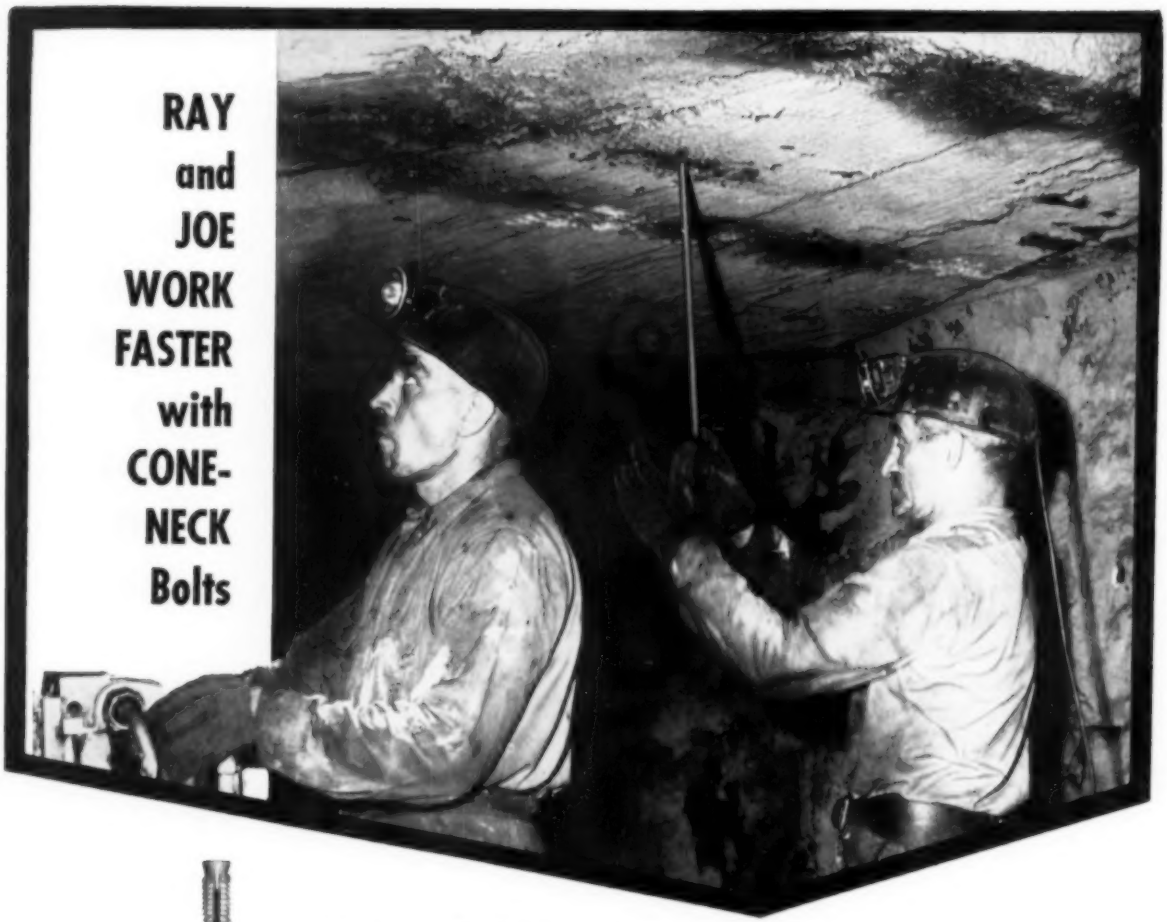
ask the men who know coal from the ground up

McNALLY PITTSBURG

MANUFACTURERS OF EQUIPMENT TO MAKE COAL A BETTER FUEL

McNally Pittsburg Manufacturing Corporation—Manufacturing Plants: Pittsburg, Kansas • Wellston, Ohio Engineering and Sales Offices: Pittsburgh • Chicago Rio de Janeiro • Pittsburg, Kansas • Wellston, Ohio

RAY and JOE WORK FASTER with CONE-NECK Bolts



CONE-NECK CONSTRUCTION

It's guaranteed safer because the washer fits centrally and closely.

better bolting crews agree . . .

installation is **faster . . . easier** *with* **CONE-NECKS!**

Raphael Swisher and Joe Palma are one of the many fine bolting crews using West Virginia roof bolts. They have no problems keeping ahead of the cutting and shooting crews using West Virginia Cone-Neck roof bolts.

Cone-Neck bolts are much easier to install. There's no on-the-job assembly problem, because the washer slides on over the unit.

2 unit styles available

Style "R" shown
Wedgegrip also available

West Virginia Works
CONNORS STEEL DIVISION
H. K. PORTER COMPANY

HKP

BETTER PRODUCTS West Virginia Works SINCE 1907

Every Bite is a Payload

The effective use of power equipment is the very essence of successful mining operations. And everywhere that power is used in mines, you'll find Simplex-TIREX cords and cables on the job. These expertly engineered cords and cables, newly improved for greater flexibility, feature cured-in-lead Neoprene Armor that resists abrasion, oil, heat and water . . . gives longest life. **SIMPLEX WIRE & CABLE CO.,** 79 Sidney Street, Cambridge 39, Mass.

Wire sculpture by Henry Szafarz

Shovel Cable Type SH-D

LIVE BETTER ELECTRICALLY

Simplex
TIREX

Mine Superintendent* Patents New Removable Stud Assembly for Conveyor Rolls

Tired of the ever increasing maintenance costs on conveyor rolls and the waste of good rolls that were discarded only because their shafts had become worn . . . or, if the shafts were built up and machined to size, the expense could not be reasonably justified—this Mine Superintendent determined to do something about it, and he has!

The result, after much experimental work, is a REMOVABLE BALL BEARING STUD ASSEMBLY that has successfully and economically solved conveyor roll maintenance problems. His invention also allows rollers to be used for much longer periods than has been possible in the past.

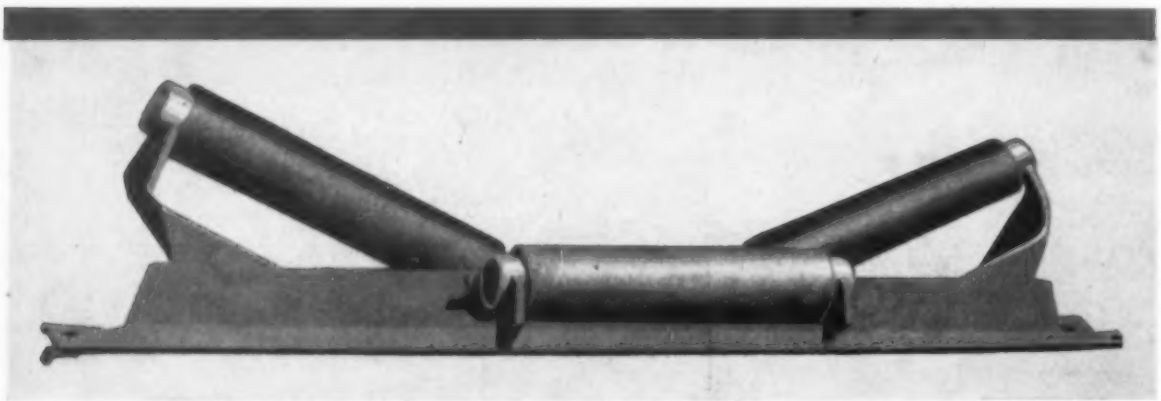
Bearings, Inc., always alert for proven products in the bearing field, feels privileged to have shared in the development of this product. We have now been given exclusive sales rights by the patent holder.

CONSIDER THESE FEATURES

The conveyor roller shaft turns in ball bearings which are mounted in the removable studs (see illustration above). No longer is a stock of rollers necessary—Just the bearing studs required for emergency replacement. Bearings, Inc. now carries stocks of these studs and rollers of proper shaft size and fit. We can supply any quantity immediately.

All maintenance is done at the conveyor—rollers remain on the job. It's quick and easy to remove damaged or worn studs, replace it with a new stud and bearing assembly—slip in the roller shaft and the job is done.

The useful life of the bearing in the stud is exceptional since all rolls are machined to the proper internal clearance and the bearings carefully mounted in line with two running rolls. Holding perfect alignment, means longer belt life since true rollers mean substantially less wear on the belt itself.

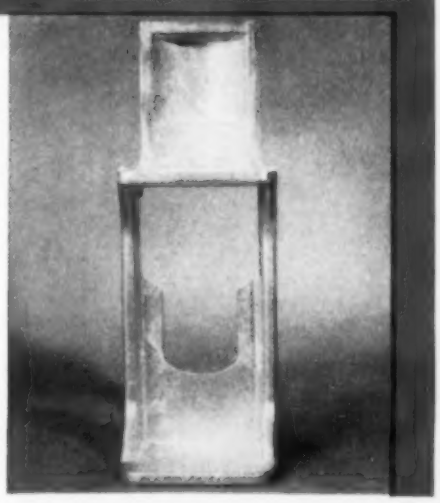


Conveyor Rolls Last Indefinitely!
Maintenance Time to Service Conveyor Rolls Cut from Hours to Minutes

Bearings, Inc. Return Idler Roll Bracket

Cut your inventory in half! This newly developed bracket serves right and left sides. Mount any roller in this new bracket without removing bracket from belt line. Big savings in conveyor down-time assured.

✱ *Name on Request*



BEARINGS, INC.

OHIO: Akron • Canton • Cincinnati • Cleveland • Kenton • Norwalk • Tyrla • Warren • Zanesville • Mansfield • Toledo • Youngstown • Zanesville
INDIANA: Ft. Wayne • Indianapolis • Muncie • Terre Haute
PENNSYLVANIA: Erie • Philadelphia • Pittsburgh • York
WEST VIRGINIA: Huntington • Wheeling
NEW JERSEY: Camden
Subsidiaries: Balanrol Corp. • Baltimore, Md. • Buffalo, N.Y.•
Kentucky Ball and Roller Bearing Co. • Louisville, Ky.

BEARINGS, INC., 3634 Euclid Ave.
Cleveland 15, Ohio

Gentlemen:
I would like to hear more about your new removable stud assembly.

NAME _____

FIRM _____

ADDRESS _____

CITY _____ ZONE _____ STATE _____

Haul underground .
KOEHRING COMPANY, Milwaukee 16, Wis.
Subsidiaries: PARSONS
KWIK-MIX • JOHNSON

. . . or on the surface with Dumptors

Trackless mining — Hauling zinc ore from underground mine to railroad siding, 3 Koehring Dumptors ramp-load directly into cars. On this trackless haulage operation, the 6-yard Dumptors are loaded underground by a tractor-shovel. They travel along tunnel to an inclined haul-way, where they have an 1100-foot climb up 11½% grade to the mine entrance. Production for the 3 heavy-duty haulers has averaged 500 tons of ore a day — and the mine foreman reports that maintenance has been "almost nil". It's easy to see why. For one thing, Dumptors have no troublesome body-hoists. *Gravity* dumps the load — and gravity-dump never balks, never wears out.

14 Dumptors in one mine —

On extensive open-pit stripping to uncover lithium deposits, rocky overburden is hauled by a fleet of 14 Koehring Dumptors. They also carry ore from pit to stockpile. Excavating is handled by tractor-type loaders and power shovels. Notice how Dumptor's big square body opening and low rear entry permits fast loading over the end or sides.

Up-hill haul all the way —

Teamed with a Koehring 1½-yard shovel, 3 Dumptors haul up steep grade out of pit, then climb ramp to dump. These off-road 6-yard Dumptors have better than 6 h.p. per ton of loaded weight. They accelerate fast, pull through soft ground, up grades with less shifting, climb 24% grades fully loaded.

Prospecting for pay dirt —

At exploratory mine in the Rocky Mountain region, Dumptor goes underground, shuttles in and out of access tunnel without turning. There's no need to turn, because Dumptor has 3-speed travel in either direction — operates with equal ease coming or going. It's as efficient underground as it is on overhead trestles, or hauling along the surface.

If your work involves hauling rock, gravel, ore and other materials under difficult conditions, let your Koehring distributor show you what this 6-yard heavy-duty Dumptor® can do for you.

Haven't you, too, decided now . . .

Conversion Pays

PERHAPS you have already had Lee-Norse convert some of your track-mounted equipment to trackless . . . or perhaps you have heard about Lee-Norse conversions from others who know from experience "It's Smart to Convert." No matter, we think you know by now that Lee-Norse can give you

TRACK to TRACKLESS
Economy for LESS . . .

CONVERTED GOODMAN
460 OR 360 LOADER

If you clearly compare - You'll quickly convert

CONVERTED JEFFREY
29U CUTTER

Yours will be a more efficient and mobile operation when your present conventional cutters, loaders, and shuttle cars move rapidly and unrestricted on rubber tires:

CONVERSION requires only a modest investment when compared with new equipment.

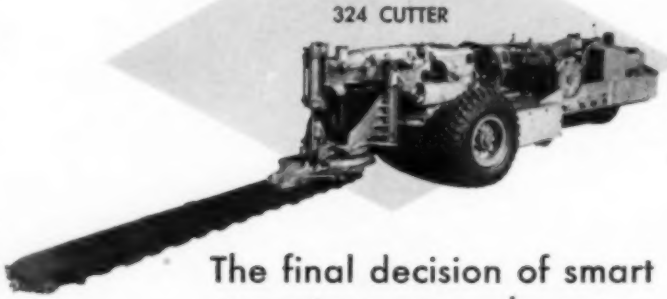
CONVERSION requires only a slight increase in spare parts stock.

CONVERSION saves re-educating your operators and maintenance crew.

CONVERSION is done in less than a month—little time lost during changeover.

CONVERSION holds obsolescence losses to a bare minimum.

CONVERTED GOODMAN
324 CUTTER



The final decision of smart operators everywhere — *CONVERSION PAYS!*

Lee-Norse Company

CHARLEROI, PA.

DESIGNERS AND BUILDERS OF THE FAMOUS LEE-NORSE MINER, PORTAL BUS AND JITNEY

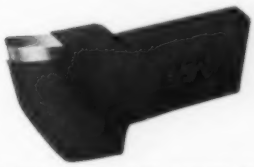
V-R MINER BITS

FOR EVERY APPLICATION

Last longer, save time and trouble ... cost less to use

STYLE LN-1 MINER BIT for latest type miners—specially designed for solid mounting.

STYLE CM-3 BIT for Rotary Type Miners. Here is the answer to the problem of bit breakage in outside positions.



STYLE CA AUGER MINER BIT —specially engineered and designed for auger miners. Available in 1½" and 1¾" gauge lengths.

STYLE CM CONTINUOUS MINER BIT—improved flange design provides firmer support, prevents twist, resists breakage.

Combine a properly designed, heavy duty shank with the longest-lasting carbide available anywhere . . . and you have bits that wear and wear. That's what you get when you use V-R bits.

V-R manufactures its own carbides . . . has been a leader in the field since 1930. The carbide in V-R bits is an exclusive development providing exceptional resistance to abrasion and impact. Uniformity of product is assured by advanced quality control procedures from powder to finished product.

Buy the bits that are beating them all—V-R Bits.

ASK FOR LITERATURE—call your V-R Representative or distributor, or write:

Vascoloy-Ramet Corporation

808 Market St. Waukegan, Illinois

SUBSIDIARY OF FANSTEEL METALLURGICAL CORPORATION

MANUFACTURERS OF CEMENTED CARBIDES • MINING TOOLS AND CUTTING TOOLS

M-592

How track like this can brighten your profit picture

Moving the coal out is, as you know, one of the major phases of mining. And the trend in profitable haulage is toward longer, heavier trips and higher speeds. Well-designed, heavy-duty haulage track, like that pictured here, is the very backbone of modern operations.

This haulageway didn't just grow up; it was carefully and methodically planned to meet the growing needs of the mine. Part and parcel of its development was the experience and technical knowledge of Bethlehem mine-track engineers.

When a Bethlehem engineer moves in on your mine-haulage problem, he will start with a detailed study of the workings. Then, after a huddle with specialists here, he will present plans to you that have been tailored to the practical needs of your mine, based on first-hand knowledge of those needs.

All rail will come to you cut to size and properly curved. All track components will fit perfectly, thanks to painstaking preassembly on our layout floors. All necessary parts will be included.

This is the long-range-economy way to improve your haulageway and brighten the profit picture. And many mines have found the "range" not so "long" after all; in fact, they were surprised at how quickly their Bethlehem layout paid for itself. The first step costs no money, carries no obligation: just call in a Bethlehem engineer for a look-see. He can be reached through the nearest Bethlehem sales office, or at our general offices here in Bethlehem.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. *Export Distributor:* Bethlehem Steel Export Corporation

BETHLEHEM STEEL

BETHLEHEM STEEL

Percy, Illinois . . .

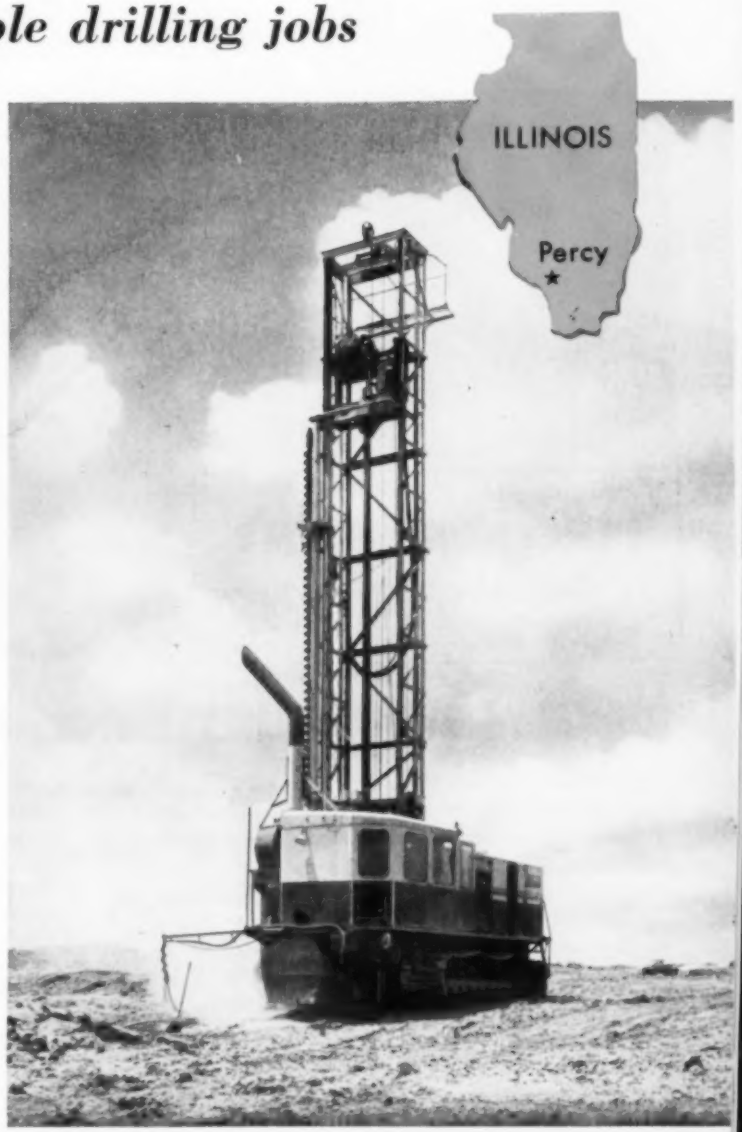
another example of how Bucyrus-Erie rotaries cut costs on blast hole drilling jobs

During a nine-month period this 50-R, drilling 10⅝-in. holes at the Southwestern Illinois Coal Corporation mine near Percy, averaged 526 feet per shift. Average hole depth was 44 feet in a formation consisting of 45% surface material, 27% lime rock, and 28% shale. Auger equipment was used for drilling the surface material and rotary bits for drilling the rock and shale.

This is just one of many case histories that prove the drilling superiority of Bucyrus-Erie rotaries. Behind the fine performance of the 50-R, which drills 9⅞- to 12¼-in. holes, and the 40-R, which drills 6¾- to 9-in. holes, are such outstanding features as these:

Ward Leonard electric control on rotation of the drill stem permits drilling at the most efficient speed for a given formation. *Compressed air is used to remove cuttings* and to cool the bit. Fine cuttings are picked up and handled by a precipitator; heavies pile up adjacent to the drill hole for use as stemming material.

Hydraulically-powered down pressure on the bit provides maximum controlled penetration. *Hole can be drilled continuously* for 32 ft. 9 in. (50-R) and 27 ft. 9 in. (40-R) before an additional pipe section has to be added. *A remote-controlled, power-driven drill pipe rack* adds or removes drill pipe without manual effort. Rack also stores pipe not in use.



These features can speed operations and cut costs at YOUR mine. For detailed, illustrated literature explaining how Bucyrus-Erie rotaries are achieving coal mine economies, write today to:

41856C

BUCYRUS ERIE

South Milwaukee, Wisconsin

How track like this can brighten your profit picture

Moving the coal out is, as you know, one of the major phases of mining. And the trend in profitable haulage is toward longer, heavier trips and higher speeds. Well-designed, heavy-duty haulage track, like that pictured here, is the very backbone of modern operations.

This haulageway didn't just grow up; it was carefully and methodically planned to meet the growing needs of the mine. Part and parcel of its development was the experience and technical knowledge of Bethlehem mine-track engineers.

When a Bethlehem engineer moves in on your mine-haulage problem, he will start with a detailed study of the workings. Then, after a huddle with specialists here, he will present plans to you that have been tailored to the practical needs of your mine, based on first-hand knowledge of those needs.

All rail will come to you cut to size and properly curved. All track components will fit perfectly, thanks to painstaking preassembly on our layout floors. All necessary parts will be included.

This is the long-range-economy way to improve your haulageway and brighten the profit picture. And many mines have found the "range" not so "long" after all; in fact, they were surprised at how quickly their Bethlehem layout paid for itself. The first step costs no money, carries no obligation: just call in a Bethlehem engineer for a look-see. He can be reached through the nearest Bethlehem sales office, or at our general offices here in Bethlehem.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. *Export Distributor:* Bethlehem Steel Export Corporation

BETHLEHEM STEEL

Percy, Illinois . . .

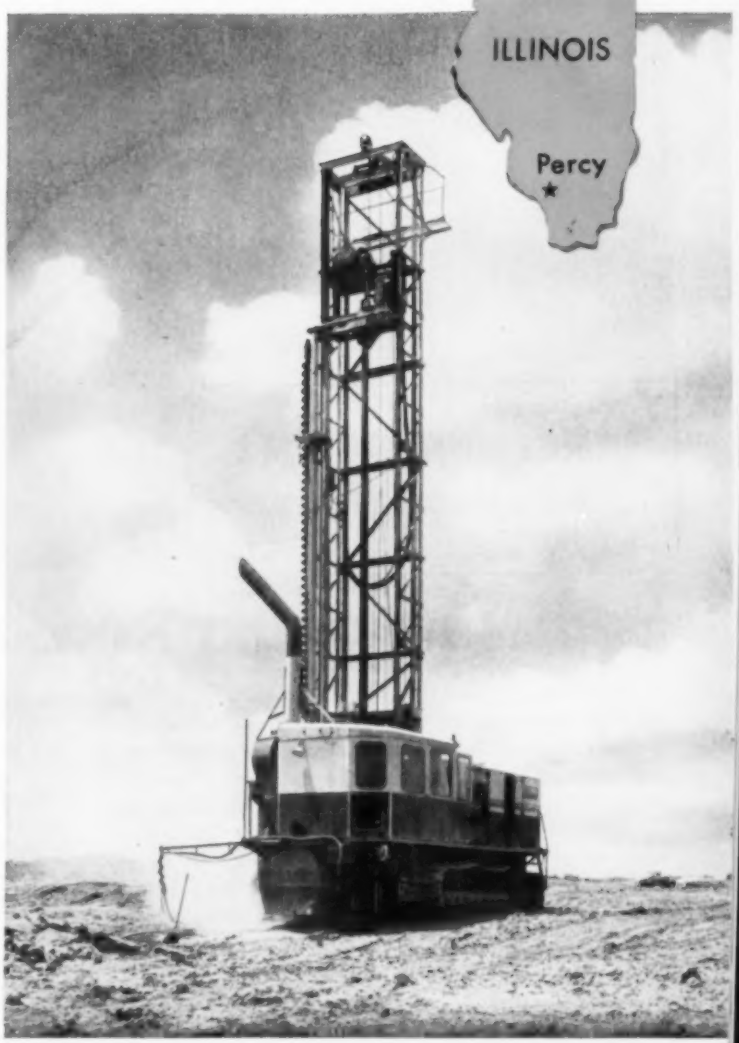
another example of how Bucyrus-Erie rotaries cut costs on blast hole drilling jobs

During a nine-month period this 50-R, drilling 10⅝-in. holes at the Southwestern Illinois Coal Corporation mine near Percy, averaged 526 feet per shift. Average hole depth was 44 feet in a formation consisting of 45% surface material, 27% lime rock, and 28% shale. Auger equipment was used for drilling the surface material and rotary bits for drilling the rock and shale.

This is just one of many case histories that prove the drilling superiority of Bucyrus-Erie rotaries. Behind the fine performance of the 50-R, which drills 9⅞- to 12¼-in. holes, and the 40-R, which drills 6¾- to 9-in. holes, are such outstanding features as these:

Ward Leonard electric control on rotation of the drill stem permits drilling at the most efficient speed for a given formation. *Compressed air is used to remove cuttings* and to cool the bit. Fine cuttings are picked up and handled by a precipitator; heavies pile up adjacent to the drill hole for use as stemming material.

Hydraulically-powered down pressure on the bit provides maximum controlled penetration. *Hole can be drilled continuously* for 32 ft. 9 in. (50-R) and 27 ft. 9 in. (40-R) before an additional pipe section has to be added. *A remote-controlled, power-driven drill pipe rack* adds or removes drill pipe without manual effort. Rack also stores pipe not in use.

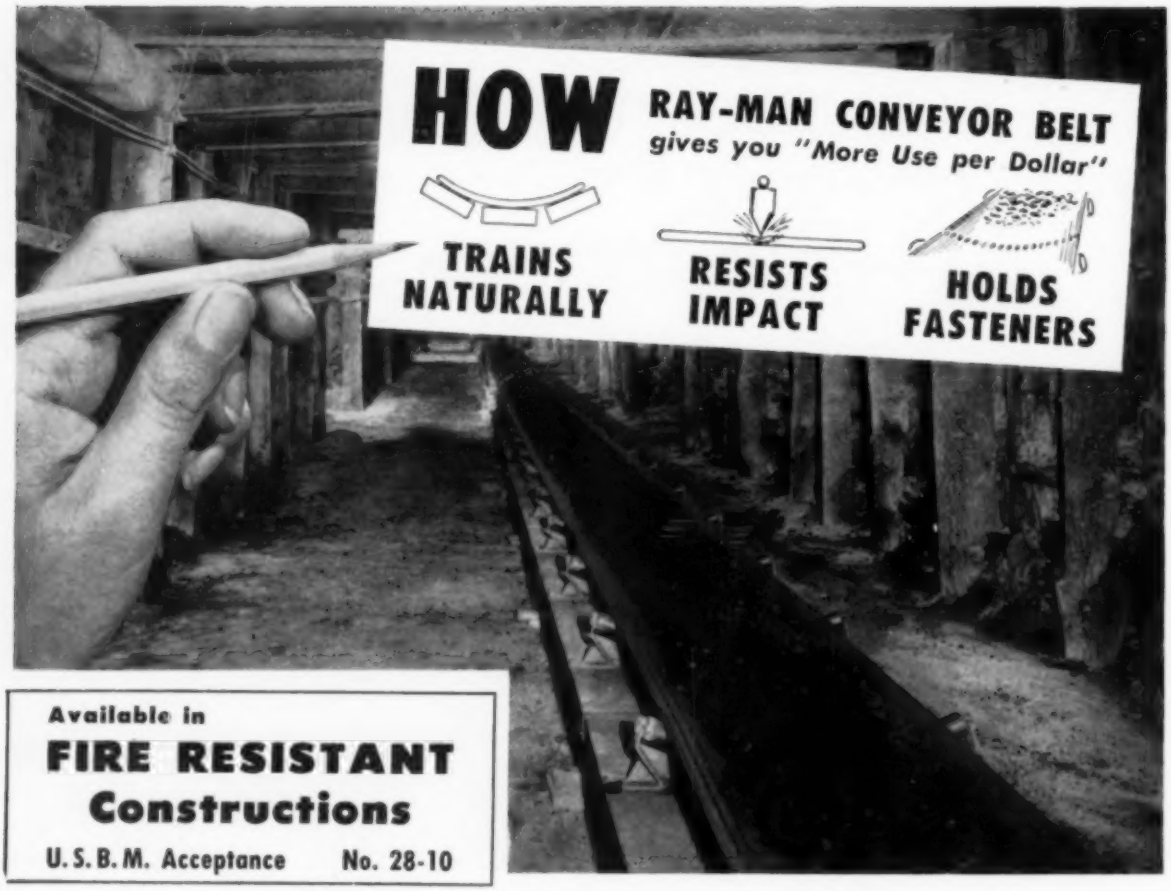


These features can speed operations and cut costs at YOUR mine. For detailed, illustrated literature explaining how Bucyrus-Erie rotaries are achieving coal mine economies, write today to:

41B56C

BUCYRUS ERIE

South Milwaukee, Wisconsin



Ray-Man Belt "TRAINS" Naturally and Hauls More Coal

Engineered features of Ray-Man Conveyor Belt give it the easy troughability and wear resistance to handle the heaviest loads. Special cushioned strength members and strong, yet resilient synthetic outer plies provide compensation to give this belt unusual flexibility. It permits full loads even where thick, narrow belts are used, or where belts must round small pulleys. Ray-Man Conveyor Belt requires no breaker strip . . . yet it resists gouging, tearing and ripping from large, abrasive lumps better than other constructions. It holds fasteners under the most severe operating conditions.

Ray-Man is mildew-proof and moisture resistant. Like other Manhattan heavy duty conveyor belts, it features R/M's exclusive "XDC" Cover which gives it protection against wear, tear, cuts and abrasion never before possible. We say Ray-Man Conveyor Belt gives you "More Use per Dollar" because it does a better job . . . and it *lasts longer.*

Let an R/M representative show you the advantages of Ray-Man as well as other R/M feature conveyor belts . . . extra-cushioned Homocord, for unusually abusive shock loading . . . R/M Tension-Master for extra long lifts and high tensions. For the best conveyor belt to meet your job requirements . . . for "More Use per Dollar" . . . contact an R/M representative today.

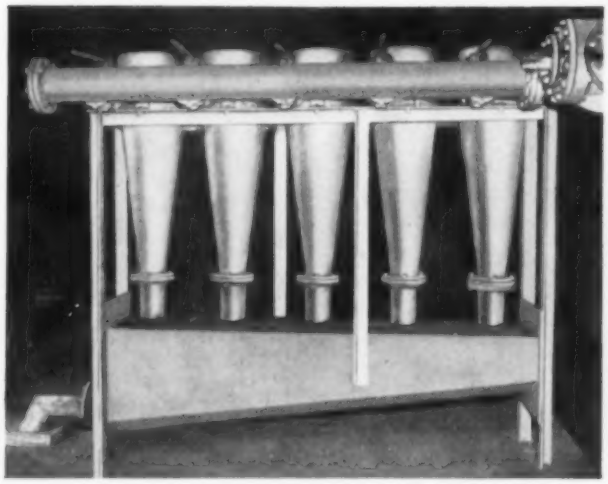
RM-602C

MANHATTAN RUBBER DIVISION—PASSAIC, NEW JERSEY

RAYBESTOS-MANHATTAN, INC.

Other R/M products include: Industrial Rubber • Fan Belts • Radiator Hose • Brake Linings • Brake Blocks • Clutch Facings Asbestos Textiles • Packings • Engineered Plastic, and Sintered Metal Products • Laundry Pads and Covers • Bowling Balls

Heyl & Patterson CYCLONES



Prevent Stream Pollution from Coal Washer at World's Largest Coke and Chemical Plant

The use of Heyl & Patterson Cyclones at United States Steel Corporation's Clairton Coke and Chemical Plant coal washer provides additional water clarification facilities to maintain capacity and a closed water circuit as mining practices change. This washer has always operated with a closed water system.

H & P Cyclones contribute also to uniform functioning of the coal washing equipment by controlling washing water density.

This plant has enjoyed satisfactory cyclone operations for more than 5 years. Many similar installations throughout the coal industry confirm these good results.

By eliminating all discharge to streams, sewers or ponds, Heyl & Patterson closed circuits make it easy to comply with clean stream laws.

CHECK THESE ADVANTAGES!

- ☐ Closed circuit operation
- ☐ Recovery of fine coal
- ☐ Prevention of stream pollution
- ☐ Controlled washing water densities
- ☐ Conservation of water
- ☐ Sharp classification for washing operation

Get All The Facts...
Write For Booklet CT-954

Heyl & Patterson INC.

55 FORT PITT BLVD. • PITTSBURGH 22, PA. • PHONE COurt 1-0750

JOY MINING TEAM

Above, left: The Joy 11-RU is a fast-tramming, fast-cutting, rubber-tired universal cutter that will shear-cut, bottom-cut, center-cut or top-cut anywhere in the seam. Only 31" high for trackless operation in medium-low coal, and equipped with field-proved Bugduster.

Above, right: The Joy Super 14-BU is in a class by itself among self-propelled mechanical loaders for medium-height seams. Built in 31½", 33" and 36" heights, with maximum loading capacity of 10 tons per minute, this dependable unit is powered and constructed on the "extra" principle throughout, for maximum speed and ruggedness in heavy duty service.

Center, left: The CD-22 Coal Drill is a single-boom hydraulic drill, 30" high. Rubber tire-mounted and readily maneuverable, this mobile Joy drill permits fast and accurate hole positioning. Infinitely variable hydraulic control of feed and speed assures fast drilling under all conditions.

Bottom, left: The Joy 6-SC Shuttle Car can make its round trip from the face in less time than any other car in its class. Has exclusive features of drive, steering, braking and control that mean greater speed, power, maneuverability, safety and dependability. Built in heights from 29" to 38½" for capacities from 100 to 180 cu. ft.

HITS 870-TON SHIFT

JOY 11-RU WITH BUGDUSTER, CD-22, SUPER 14-BU AND 6-SC COMBINATION AVERAGES OVER 500 TONS PER SHIFT

Equipment Team: one Joy 11-RU Universal Cutter with Bugduster, one Joy CD-22 Coal Drill, one Joy Super 14-BU Loader and three Joy 6-SC Shuttle Cars.

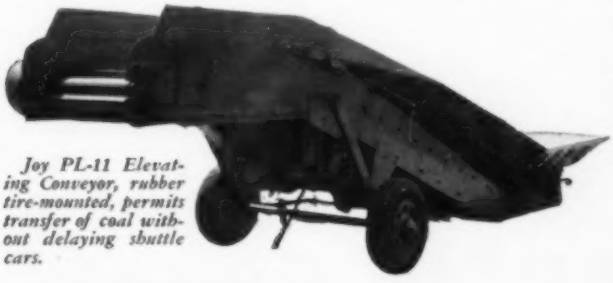
Number of Men: 13-man production crew.

Operating Conditions: This equipment is being used in a West Virginia mine, working in a seam varying from 4½ to 6 feet high. The seam contains a band of hard slate 4″ to 8″ thick. Grades encountered vary from 3 to 4 per cent. The top is slate and laminated sandstone, bolted with expansion bolts; and the bottom is firm fireclay. The average shuttle car haul one-way is 275 feet, with a maximum one-way trip of 500 feet. A Joy PL-11 Elevating Conveyor receives coal from the shuttle cars at the mine car loading point.

Performance Record: Average production over a month's period has exceeded 500 tons per shift. Maximum production reached a high of 870 tons per shift.

* * *

No matter what your requirements may be, there is a Joy high-capacity equipment team that can help you show a profit, or increase your margin. For any system, including modern continuous mining with continuous haulage . . . or for any seam condition, Joy has a *field-proved* answer for you. ● *Let us work with you!* **Joy Manufacturing Company, Oliver Building, Pittsburgh 22, Pa.** In Canada: *Joy Manufacturing Company (Canada) Limited, Galt, Ontario.*



Joy PL-11 Elevating Conveyor, rubber tire-mounted, permits transfer of coal without delaying shuttle cars.

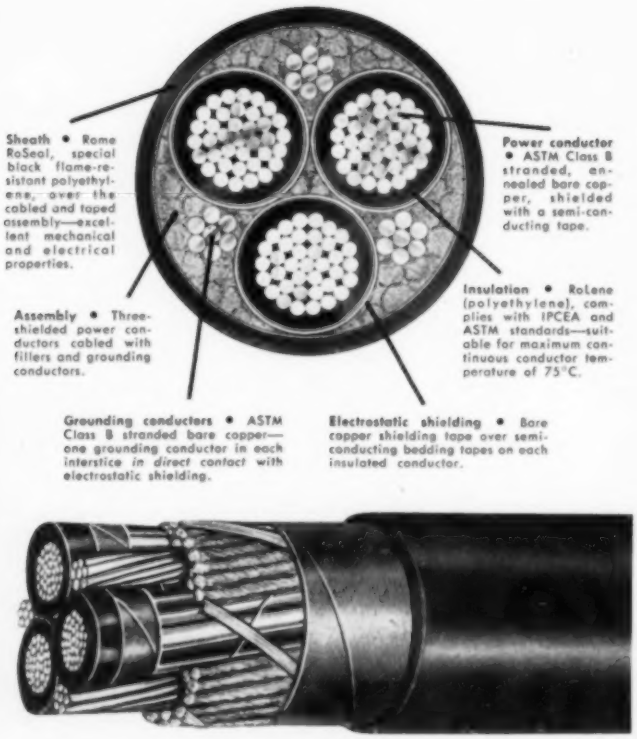
WRITE FOR BULLETINS, OR

Consult a Joy Engineer

W&D CL5302

JOY

WORLD'S LARGEST MANUFACTURER OF UNDERGROUND MINING EQUIPMENT


Sheath • Rome RoSeal, special black flame-resistant polyethylene, over the cabled and taped assembly—excellent mechanical and electrical properties.
Power conductor • ASTM Class B stranded, annealed bare copper, shielded with a semi-conducting tape.
Insulation • RoLene (polyethylene), complies with IPCEA and ASTM standards—suitable for maximum continuous conductor temperature of 75°C.
Assembly • Three-shielded power conductors cabled with fillers and grounding conductors.
Grounding conductors • ASTM Class B stranded bare copper—one grounding conductor in each interstice in direct contact with electrostatic shielding.
Electrostatic shielding • Bare copper shielding tape over semi-conducting bedding tapes on each insulated conductor.

Rome's mine power feeder cable...

Look at the special features available with Rome MPT—the easy-handling mine power feeder cable.

You get low initial cost, easy installation, and long life. And you naturally get important *safety* features: ground fault protection, a low-resistance circuit in case of shielding failure or ground faulting of equipment, and a flame-resistant jacket.

You can use Rome MPT in boreholes, shafts, trays, aerially, or underground. Sizes range from 6 AWG to 250,000 CM. A three-conductor cable, it's rated up to 5000 volts.

Specify Rome MPT for your next job. For further information, contact your nearest Rome Cable representative—or write to Department 751-B, Rome Cable Corporation, Rome, New York.

1. Costs less—up to 28%. Initial cost is lower than ordinary mine power feeder cables—as much as 28 per cent in the case of 2 AWG 3-conductor rubber and Neoprene sheathed cable 5 kv.

2. Cuts down installation time. Because it's smaller than others—and weighs less—Rome's mine power feeder cable is easier to install. Over-all weight is down as much as one-third. You can cut handling costs, use smaller fittings.

3. Lasts longer. You get a cable with one of Rome's *best* insulations and jackets. This means extra service life is built into the cable. Tough RoLene (polyethylene) insulation and a special flame-resistant RoSeal (polyethylene) jacket combine to give you outstanding resistance to chemicals, moisture, and abrasion.

ROME CABLE
CORPORATION

International® Drott®

"beat-a-fleet" advantages go underground with NEW TD-9 mining Skid-Shovel

6 attachments for unmatched versatility!

Exclusive Drott Four-In-One is a dozer, bucket, clamshell, and bullclam, all in one.

95-inch Drott bulldozer blade mounts directly onto Skid-Shovel lift arms. Easy to control!

Drott Bullangledozer blade ditches, slopes, dresses...can be angled to either side.

Rock fork constructed of super-strong alloy steel . . . withstands abrasion of loading hard, heavy minerals.

Third, extra valve of Drott Skid-Shovel controls rear-mounted heavy-duty scarifier.

Low profile, 2-prong grapple with top grab arm loads ties or mine props with full control.

You get exclusive wide work range, low equipment investment, and other "beat-a-fleet" advantages for underground mining—in the new International Drott TD-9 mining Skid-Shovel!

This new, big-capacity producer with 71 net engine hp, meets U.S. Bureau of Mines new safety standards for non-coal operations. It features the new stainless steel Drott short-coupled exhaust gas scrubber and cooler, with rear-mounted reserve water tank—and new exhaust gas diffuser. With this system, you get positive, *full 8-hour-shift* removal of harmful irritants, protection from noxious gases, and fire safety.

In addition, low, "trolley-clearing" profile (only 6′ tall) and standard length of the new machine provide unmatched full-load maneuverability, even in cramped quarters. You get all the famous Drott exclusives, too, like triple-power pry-action break-out, and shock-swallowing Hydro-Spring!

Prove the great versatility, handling ease and positive safety of this new underground mining TD-9 Drott Skid-Shovel—with your choice of buckets and attachments shown! See your International Drott Distributor for a demonstration.

International Harvester Company, 180 North Michigan Avenue, Chicago 1, Illinois
Drott Manufacturing Corp., 3126 South 27th Street, Milwaukee, 15, Wisconsin

INTERNATIONAL HARVESTER

INTERNATIONAL®
DROTT®

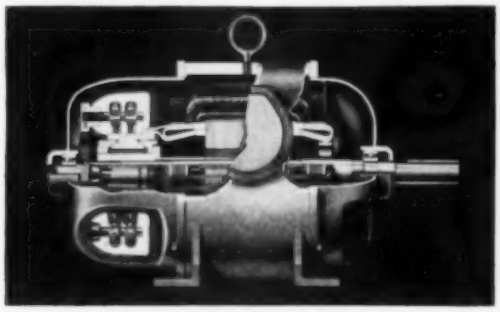
No place for motor failure!

Westinghouse motors assure continuous output of 3 conveyors averaging 600 tons in 16 hours

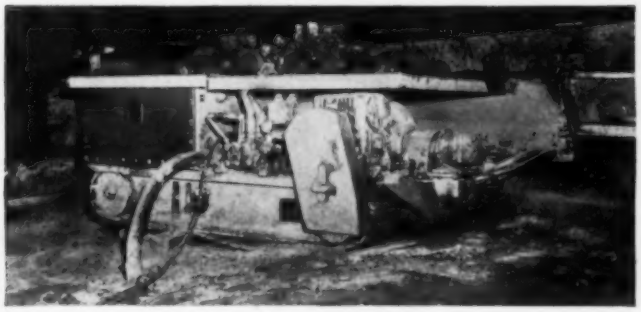
At Omar Mining Company, Westinghouse SK motors drive each of three conveyor units built by The Long Company. Dependable motor operation assures a constant stream of coal.

More than a hundred electric motors, ranging from 5 hp to 150 hp, are used at Omar's No. 15 mine . . . and in most cases they're Westinghouse because of proved performance in getting out the tonnage.

You can bring improved reliability to your operations by getting more facts about the complete line of Westinghouse SK motors, both standard and special. Contact your Westinghouse representative today. J-21967-X



Dependable Westinghouse SK motors help reduce costly down time because sealed bearings need no lubrication; armature and commutator construction assures maximum electrical stamina; controlled ventilation prevents local heating.

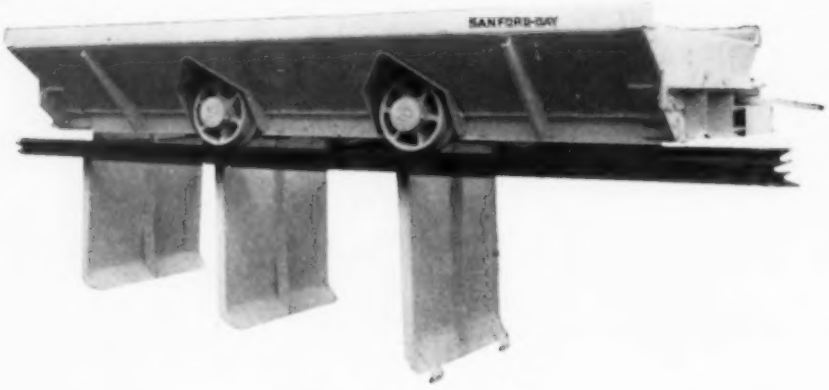


Each conveyor operates alternately from one area to another; is driven by a Westinghouse 25-hp, 250-volt, d-c motor. Planned movement of coal depends upon reliability of motors subjected to heavy loads and adverse operation conditions.

WATCH WESTINGHOUSE!

*WHERE **BIG** THINGS ARE HAPPENING FOR **YOU!***

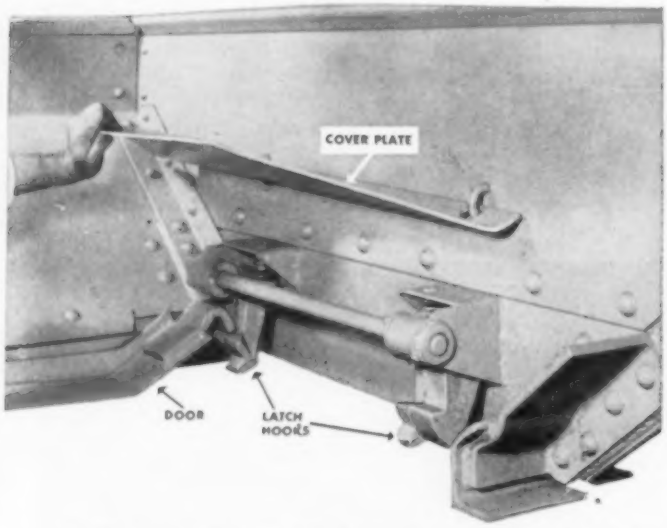
. . . You Get THREE Important



1...

You haul up to 1,000 lbs. more per car with S-D Automatics!

ONE-QUARTER to ½ ton more capacity per car for the same overall dimensions is available only in S-D Automatics because of the construction features of Sanford-Day's exclusive bottom dumping car design. If you were buying, for example, 16 bottom dumping cars of any other make with a 4-ton level full capacity, you would need only 14 S-D Automatics of the same overall dimensions to haul the same tonnage. You would save two cars in every 16 . . . 12½ percent in original investment . . . 12½ percent in maintenance . . . 12½ percent less dead weight to haul. Any one of our sales engineers will demonstrate to your complete satisfaction just how we are able to give you this extra capacity.



● S-D AUTOMATIC car doors open only when exclusive "Twin Safety Latches" are tripped simultaneously. The simultaneous unlatching can be accomplished only by the independently operated pair of tripping devices mounted between rails. They act as two padlocks preventing doors opening accidentally anywhere along the haulage route. Cutaway view at right shows the "Twin Safety Latches" with cover plate raised. Drawing illustrates how each tripping device between the rails unlocks the doors while the trip is moving over the bin.

2...

Only S-D Automatics have "Twin Safety Latches" for Safe and Sure Latching

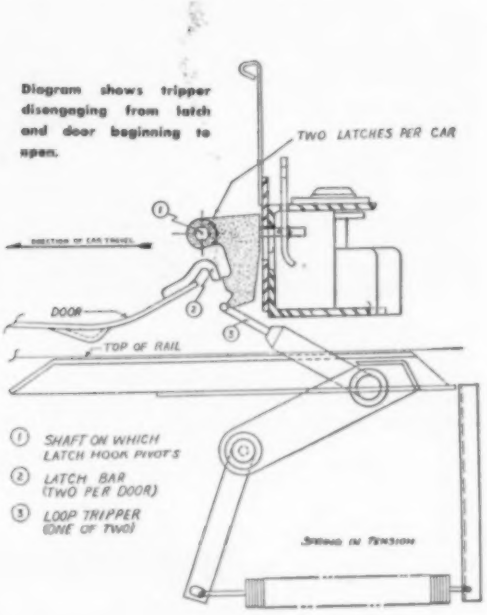


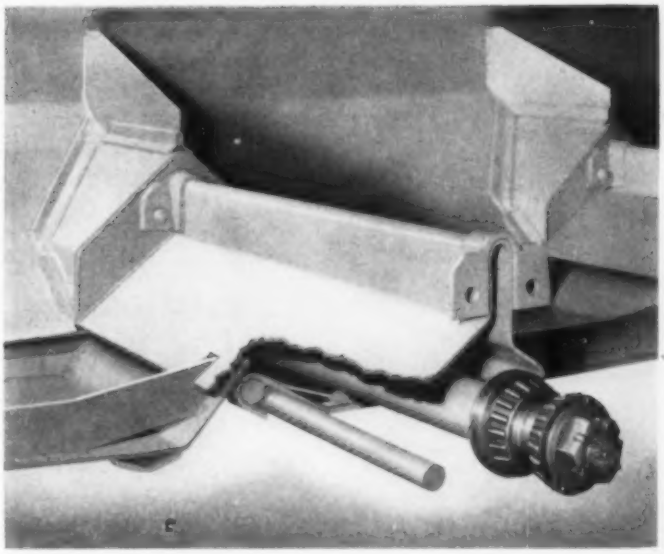
Diagram shows tripper disengaging from latch and door beginning to open.
TWO LATCHES PER CAR
DOOR
TOP OF RAIL
① SHAFT ON WHICH LATCH HOOK PIVOTS
② LATCH BAR (TWO PER DOOR)
③ LOOP TRIPPER (ONE OF TWO)

Advantages with S-D "Automatics"

3...

Only S-D Automatics are Safety-Sealed against Dust Leakage

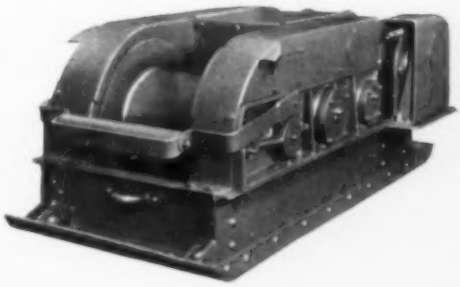
THIS MEANS TWO EXTRA VALUES: (1) Sealed S-D Automatics give you a new, safer in-the-mine operation by eliminating leakage of dust. (2) Sealed S-D Automatics enable you to make a tremendous reduction in track clean-up costs. Photograph at right of a cross section view of the inside of a Sealed S-D Automatic shows you why dust cannot shake down and out through the clearance space between doors and frame.

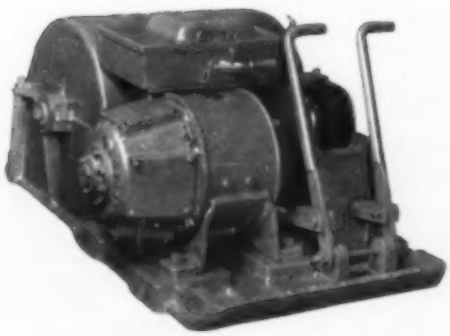


SELECT YOUR HOIST FROM THE BROWNIE LINE

. . . there is a BROWNIE to meet every requirement!

BROWNIE rigging hoists, room hoists, haulage hoists, car-spotting hoists, layer loading hoists — hoists for every haulage use. Be sure you obtain the right hoist to meet your requirements. Investigate the BROWNIE line. Also see us for Oil Spray Outfits, Gathering Pumps and Pump Accessories, Blowers, Brownie Rerailers and Derailers. **BROWN-FAYRO DIVISION, Sanford-Day Iron Works, Telephone 3-4191, Knoxville, Tenn.**

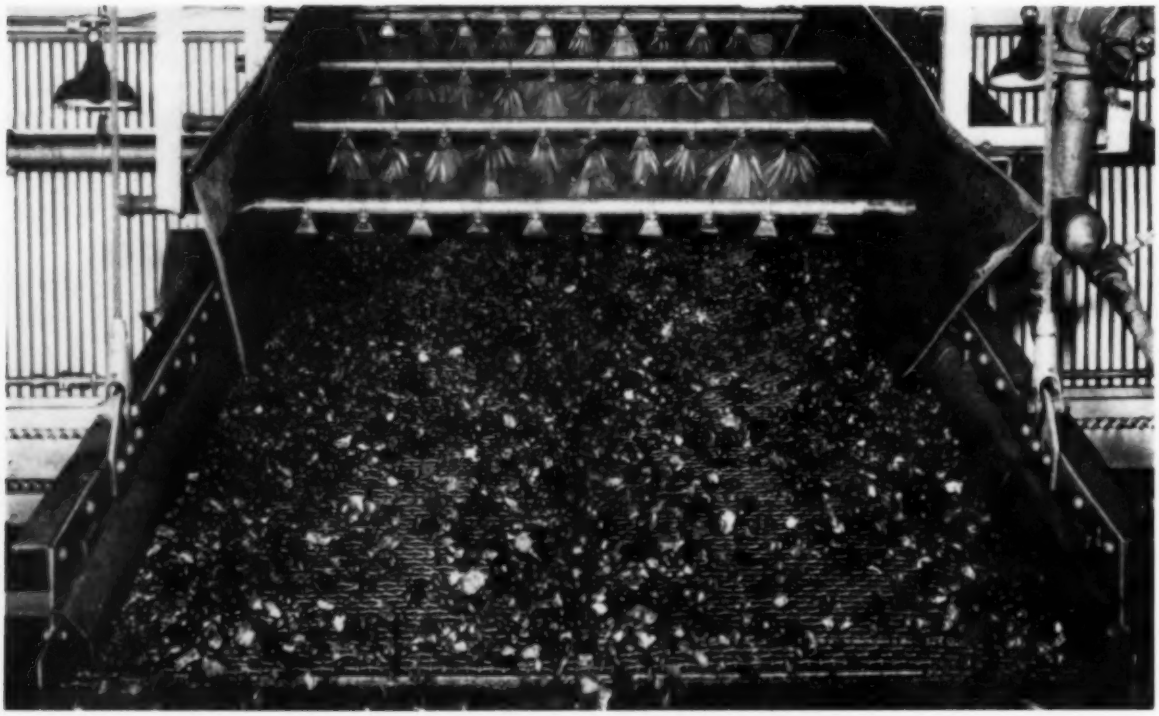




SANFORD-DAY

KNOXVILLE, TENNESSEE

SUPER MARKET FOR MINE CARS — all types . . . PRECISION WHEELS . . . BROWNIE HOISTS . . . GISMO SELF-LOADING TRANSPORT that loads in development or production . . . transports . . . supports 2 to 3 jib mounted drills . . . back fills . . . moves boulder rocks . . . makes its own roadways and cleans up completely — a new method of hard rock mining offering a tremendous reduction in cost per ton!



At coal processing plants throughout the nation, Wissco-Loy Screens are the choice for sizing operations. ***It's because...***

...WISSCO-LOY® SPACE SCREENS

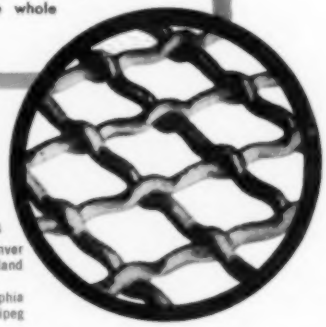
are economical, yet tailor-made for the job!

There's an easy way to help reduce your cost per ton of material screened—just switch to economical Wissco-Loy Space Screens.

Although they are economical in initial cost, Wissco-Loy Screens offer maximum accuracy because *they are tailor-made to your specific need.* Long-lived? You bet! Wissco-Loy Screens are made from a tough special wire, and every knuckle is carefully crimped to prevent "hidden wear" at the wire intersections.

What's more, Wickwire engineers are always available to help you solve your screening problems and then to recommend the right screen for your job. Get the whole story right now without obligation. Just contact your nearby CF&I representative or write direct to the nearest sales office listed below.

Need stainless steel space cloth or extra-rugged screens? Your CF&I representative is the man to see for these, too. He can supply a complete line of stainless steel, as well as extra-tough, oil-tempered Super-Tempered Precision Space Screens. Get the whole story from him today!



CF&I SPACE SCREENS
THE COLORADO FUEL AND IRON CORPORATION

4233

THE COLORADO FUEL AND IRON CORPORATION—Albuquerque • Amarillo • Billings • Boise • Butte • Casper • Denver
El Paso • Ft. Worth • Houston • Kansas City • Lincoln (Neb.) • Los Angeles • Oakland • Oklahoma City • Phoenix • Portland
Pueblo • Salt Lake City • San Antonio • San Francisco • Seattle • Spokane • Wichita
WICKWIRE SPENCER STEEL DIVISION—Atlanta • Boston • Buffalo • Chicago • Detroit • New Orleans • New York • Philadelphia
CF&I OFFICES IN CANADA: Toronto • Montreal • CANADIAN REPRESENTATIVES AT: Calgary • Edmonton • Vancouver • Winnipeg

Rowe Construction Co., Bloomington, Illinois, uses the Model 374 Conveyor, one of many types and sizes of Barber-Greene portables.

The president of Rowe Construction Co. reports

"Our next portable conveyor will be another Barber-Greene"

"We have given our Barber-Greene conveyor four years of hard service and its performance has been tops. We produce sand and gravel for highway departments and for our own use. So we move our plant three and four times a year. Towing our conveyor from job to job presents no problem at all. We just hitch it up to a truck and move out.

"And it was no big job to lengthen our conveyor from 51 to 60 feet. All we did was order a nine-foot intermediate section and bolt it into place. All carriers, returns and decking were already in place and aligned.

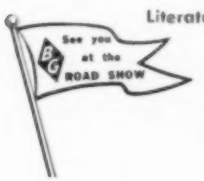
"With this kind of reliability and easy flexibility, we feel sure our next portable conveyor will be a Barber-Greene."

Straight-forward reports like D. H. Rowe's provide the proof of the superior performance and widespread acceptance of Barber-Greene conveyors. Handling coal, sand, gravel and other bulk materials, these versatile conveyors operate on a virtually automatic basis . . . cut labor costs substantially.

Not just portability, but road-ability is one of the many features that save time and money for the Rowe Construction Co.

Literature shows the many superior features of Barber-Greene portables. Write for your copy.

56-21-PO



Barber-Greene

AURORA, ILLINOIS, U.S.A.

CONVEYORS . . . LOADERS . . . DITCHERS . . . ASPHALT PAVING EQUIPMENT

Tipple at Harman, Va., where Airdox was installed at Harman's No. 3 Mine in 1954, in the production of "Dictator" coal.

"consistently better results with AIRDOX"

NON-EXPLOSIVE MINING METHOD

AIRDOX

NON-EXPLOSIVE MINING METHOD

Cuts Costs 5 Ways

- Produces less fines in face preparation
- Rolls coal forward for faster, easier loading
- Easier on "tender" roofs—cuts timbering, bolting
- Lowers cleaning costs by minimizing fines
- Reduces degradation—no shattered coal

DICTATOR

says I. J. RICHARDSON,
President,
Harman Mining Corporation

"Cardox Corporation installed their Airdox System in our No. 3 mine in 1954. We find that we are getting consistently better results with Airdox, inasmuch as the coal produced from this mine contains a larger percentage of coarse coal and the loadability is much better when loaded mechanically. Airdox is economical, too, on a cost-per-ton basis.

"The management of this mine is well pleased with the performance of Airdox and results obtained."

CARDOX CORPORATION • 307 NORTH MICHIGAN AVENUE • CHICAGO 1, ILLINOIS

WAREHOUSES and DISTRICT OFFICES

Harper, West Virginia
Phone: Beckley 4812

Benton, Illinois
Phone: Benton 8-3821

St. Clairsville, Ohio
Phone: St. Clairsville 619

Pikeville, Kentucky
Route 2, Box 99
Phone: Robinson Creek 5

Louisville, Colorado
Phone: Boulder
Hillcrest 2-7298

Library, Pennsylvania
Box 427
Phone: Library Colonial 3-6910

Camden-on-Gauley, W. Va.
Phone:
Camden-on-Gauley 2181

Evansville, Indiana
307 Northwest Fifth St.
Phone: Evansville 2-8944

Ottumwa, Iowa
Phone: Ottumwa
Murray 4-6564

NOW...Longer Bit Life, Lower Costs, *with improved design* FIRTHITE Machine Bits

Design improvements in the famous "Blue Bits," addition of a new bit for bore type continuous miners, and the introduction of a low-cost THRIFT-BIT assure an even more complete selection of mining tools to give you maximum performance at minimum cost under all mining conditions.

REDESIGNED
C-7-S
C-7-M
C-7S-4

The C-7 Series has been redesigned for even greater effectiveness by "beefing up" the area immediately supporting the carbide to absorb severest shock and impact, and streamlining the heel clearance to reduce excess steel for lower regrinding cost.

NEW
CMC

Specifically designed for bore type continuous miners, the new CMC incorporates a heavy duty head, to resist extreme side pressures, and a large self gauging shoulder on three sides that assures positive seating and minimizes holder damage.

The "face lifting" of Firthite "Blue Bits" is a continuing project of Firthite mining tool engineers . . . that's why "Blue Bits" continued to break records in heavy duty production operations.

All NEW a low cost, all purpose THRIFT-BIT

NEW
C-9

Try the new C-9 THRIFT-BIT! It is virtually a "throw-away" machine bit for general purpose cutting operations where high production at minimum cost is required. Without sacrifice of quality components Firthite engineers have produced this economy bit that performs outstandingly yet sells at the lowest price. It is the *only* economy bit made on a *premium alloy drop forge shank!*

Available from stock for immediate delivery from authorized distributors.

Firth Sterling

—INC—

GENERAL OFFICES: 3113 FORBES ST., PITTSBURGH 30, PA.

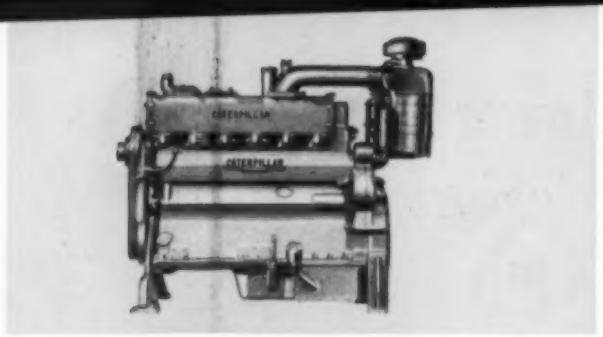
DISTRIBUTED BY:

AUSTIN POWDER COMPANY—Cleveland, Waynesburg, Evansville, Madisonville, W. Frankfort, Clarksburg
UNION SUPPLY COMPANY—Denver
AMOS A. CULP—Birmingham
McCOMB SUPPLY COMPANY—Harlan
CARLSBAD SUPPLY COMPANY—Carlsbad
SERVICE SUPPLY COMPANY—Wheeling
DUNLAP WELDING & SUPPLY—Zanesville
MOLE-BITS COMPANY—Johnstown
U. S. STEEL SUPPLY DIVISION—Pittsburgh
CARL B. LEWIS—Scranton
GUYAN MACHINERY—Logan

R-325

PRODUCTS OF FIRTH STERLING METALLURGY

High Speed Steels
Tool & Die Steels
Stainless Specialties
High Temperature Alloys
Sintered Tungsten Carbides
Firth Heavy Metal
Chromium Carbides
High Temperature Cermets
Zirconium



A QUARTER CENTURY OF

A CATERPILLAR FIRST
—the "Hi-Electro" hardened cylinder liner

A CATERPILLAR FIRST
—the chemically conditioned cylinder liner

A CATERPILLAR FIRST
—the stainless-steel piston protector

A CATERPILLAR FIRST
—the steel-backed aluminum bearing

A quarter of a century ago, Caterpillar created mobile diesel power. For the first time, the power of the diesel engine was unleashed from its bulky foundations and put to work in the field—compact, economical. Here was diesel power of simple design, with no need for experts to operate and maintain. Here was diesel power with the lugging ability to knuckle down to the tough jobs.

The introduction of mobile diesel power was a tremendous advance in many fields. It provided efficient diesel power for tractors, motor graders, earthmoving equipment . . . for the work boat, the gin, the locomotive, the oil rig, the municipal plant . . . for *any* application in which steady, low-cost power is crucial. And everywhere, CAT* Diesel Engines proved themselves durable and dependable. They established Caterpillar as the leader in diesel engineering.

Today, hundreds of thousands of modern heavy-duty Cat Diesels are on the job in every corner of the world. And still the research continues. Study and experiment go ahead constantly in Caterpillar laboratories. Special testing machines help point the way toward new advances. Manufacturing techniques improve, too, in the world's largest diesel engine factory—where the quality of workmanship is the standard for the industry.

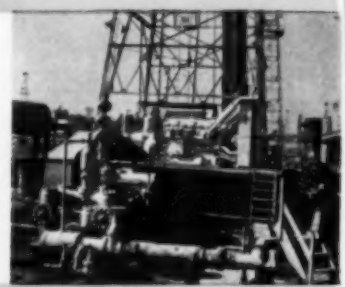
A modern world must have modern power—more and more of it. It is coming, in ever increasing quantity, from the production lines of Caterpillar, the leader.

Caterpillar Tractor Co., Peoria, Illinois, U. S. A.

CATERPILLAR*

*Caterpillar and Cat are Registered Trademarks of Caterpillar Tractor Co.

DIESEL POWER FOR PROGRESS



DIESEL LEADERSHIP

A CATERPILLAR FIRST
—interchangeable, adjustment-free fuel injection equipment

A CATERPILLAR FIRST
—the capsule-type injection valve

A CATERPILLAR FIRST
—the service meter

A CATERPILLAR FIRST
—superior lubricants (detergent oils)

with COLMOL®

an average production of 25 tons per payroll man

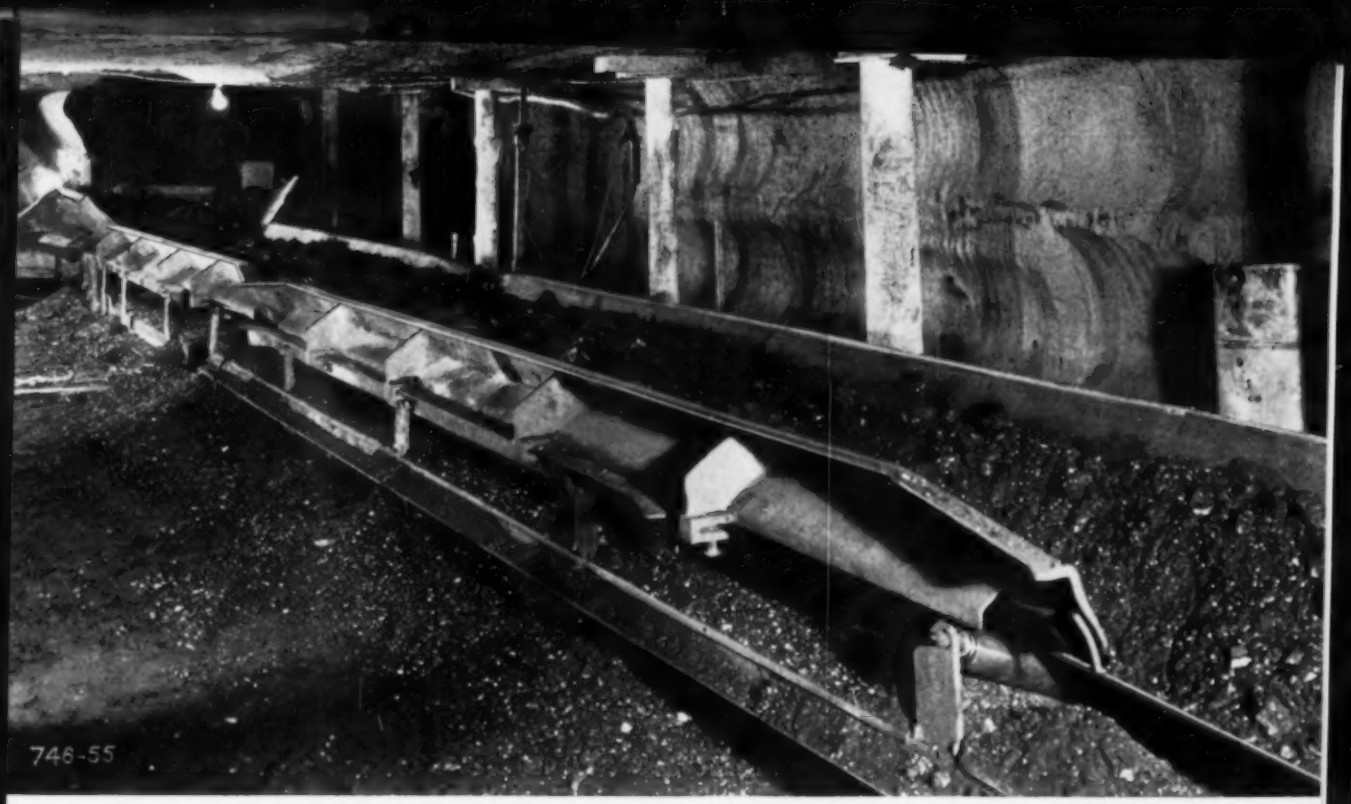
Peck's Run Coal Company, Upshur County, West Virginia, reports after two years' experience with their Colmol:

High average shift tonnages mined at lower cost; 25 tons per man on the payroll.

- Roof support costs were reduced and safety was increased, because no explosives are used.
- Bit costs are very reasonable, even though coal has a medium-hard structure, and sulphur balls and pyrite lenses occur frequently.
- Coal quality is better than obtained by conventional mining methods; ash reduced from 8.7% to 7.0% and sulphur reduced from 3.0% to 2.4%.

Redstone seam, mined since 1917, ranges in height from 50" to 72"; mainly 54" to 68". High ash and high sulphur layers persist throughout the property immediately adjacent to the top and bottom of the seam. Strict supervision of mining keeps these operations in the desirable, narrower coal where the seam is good.

A Jeffrey 76-B Colmol, with a mining range of 50½" to 66", working at Peck's Run.



A 30″ Jeffrey 52-B belt conveyor at Peck's Run.

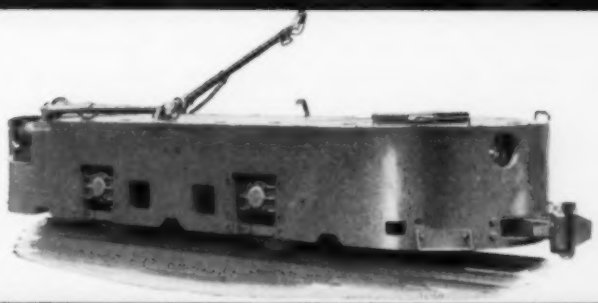
In solid mining, 3 entries are driven on 60′ centers, with a 30″ Jeffrey belt conveyor in the center entry. Single panels are developed to left and right at a 60° angle, limited to 5 blocks in depth, 80′ wide by 90′ deep, so the longest haul to the belt is 450′. Places are driven two widths of the Colmol, or 19′ wide.

The resulting pillars, 62′ by 72′, are split through by driving two widths of the Colmol. The remaining two stumps are removed by single width advances of the Colmol, leaving small triangular pillars, which make adequate roof supports, until falls are made. One block gives about 870 tons.

Present operation is three shifts, two of which are full production of about 450 tons average. The third shift mines 100 to 300 tons, since it is principally engaged in inspection, maintenance and lubrication of equipment, supplying and advancing the belt line. They also finish up places that will permit the Colmol to start the next production shift to better advantage.

The three shifts total from 1000 to 1200 tons per day, the entire output of the mine. Single shift production in excess of 600 tons has been obtained with this Jeffrey unit.

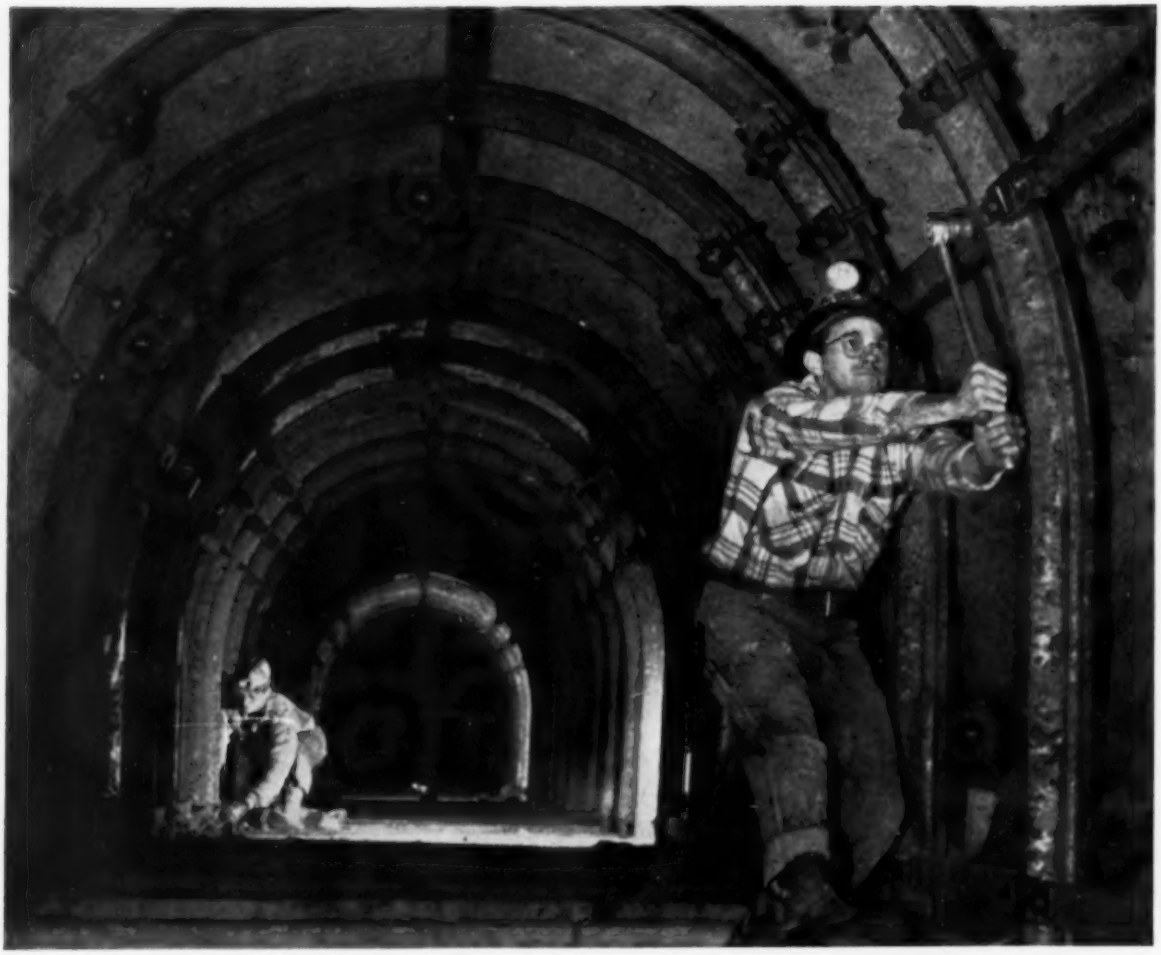
A 15-ton Jeffrey trolley locomotive hauls the coal to the tipple in 8-ton, 8-wheel mine cars for picking, crushing, sizing, and loading into railroad cars. A cleaning plant is now under construction at Peck's Run Coal Company.



The Jeffrey Manufacturing Company, Columbus 16, Ohio. District Offices: Beckley, Birmingham, Denver, Evansville, Harlan, Pittsburgh, Salt Lake City.

JEFFREY

MINING • CONVEYING • PROCESSING EQUIPMENT • TRANSMISSION MACHINERY • CONTRACT MANUFACTURING



How quickly do Yieldable Arches pay for themselves?

That's the big question, and a natural one to ask before investing in a high-quality roof support like the Bethlehem Yieldable Arch.

The experience of one iron ore mine, extreme perhaps, may be an indication. The conditions were difficult, and the mine had been using timbers 14 in. and more in diameter, practically touching one another. One by one, these timbers failed in from 4 to 6 weeks.

So they installed Bethlehem Yieldable Arch sets in the caving area. Since installation, sets have yielded sufficiently to bring the roof under control, and mining operations have continued steadily. The operators have conservatively estimated that this installation paid for itself within six months!

While this case is hardly a typical one, this much is sure: in mines having heavy roof conditions the Yieldable Arch will give improved roof support, and will pay for itself gratifyingly soon. That's because no rigid support can indefinitely withstand the dynamic pressures caused by the weight and subsidence of the overburden. Periodic replacement of rigid supports is necessary. The Yieldable Arch, on the other hand, is designed to "give," thus allowing the ground to relax slowly and form its own pressure arch.

Yieldable Arch sets are recoverable, too, for use elsewhere in the mine. They are easy to install without special equipment or costly supervision. One of our engineers will be glad to talk with you about the Yieldable Arch; you can reach him through the nearest Bethlehem office.

BETHLEHEM STEEL COMPANY
BETHLEHEM, PA.

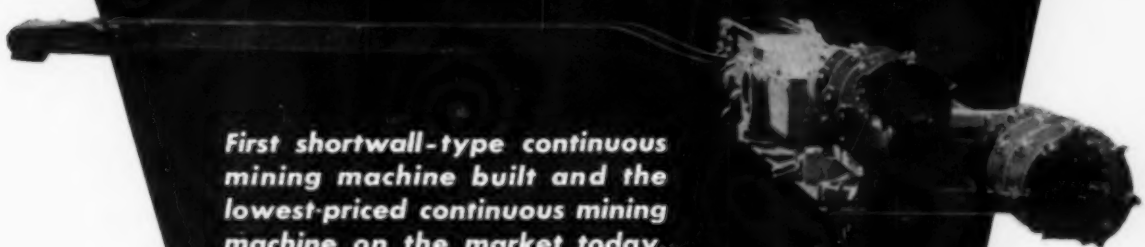
On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. Export Distributor: Bethlehem Steel Export Corporation

BETHLEHEM STEEL

BETHLEHEM STEEL

Introducing

THE NEW



First shortwall-type continuous mining machine built and the lowest-priced continuous mining machine on the market today.

WILCOX MINER

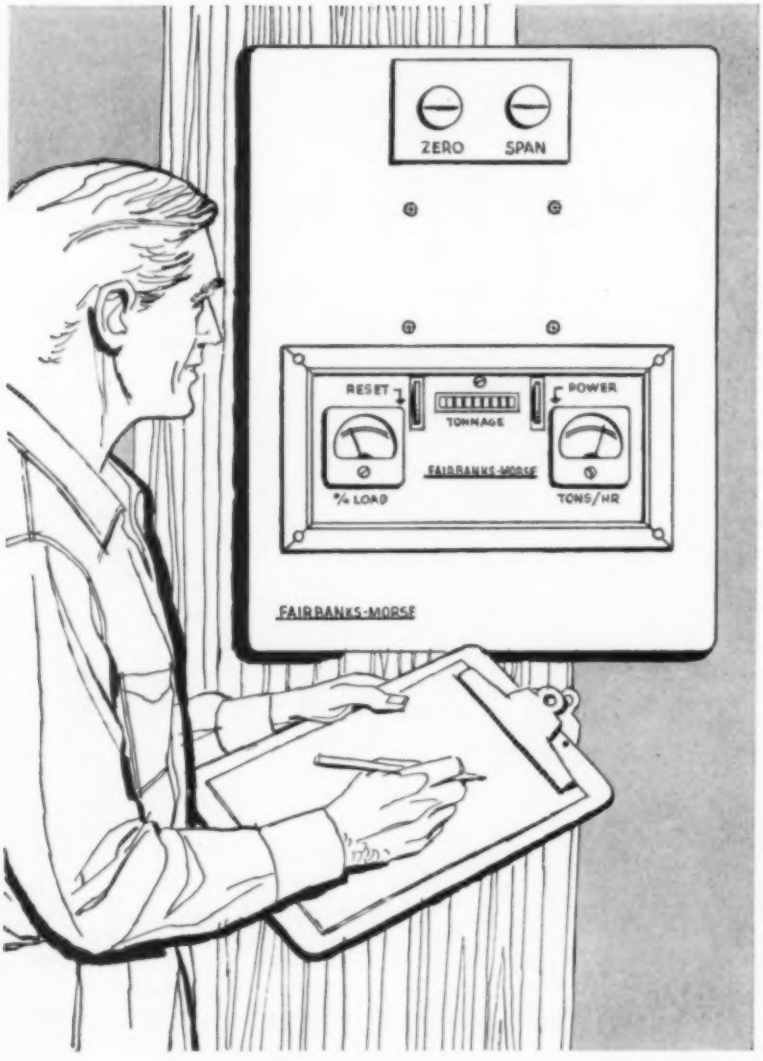
- Overall height 25": Weight approximately 7 tons.
- The only low-coal miner that can be used satisfactorily in seams 28" to 42" thick.
- Cuts all directions—forward-right-or-left.
- The Wilcox Miner can be used where most any standard bottom cutter over 25" high can be used.
- Requires no special training to operate—any good shortwall machine operator can operate the Wilcox Miner—the same applies to maintenance—any good mechanic can maintain it.
- Lower maintenance cost-per-ton than any other low-coal miner on the market today.
- Will produce 1 to 1¼ tons per minute in 36" to 42" coal while cutting, and can be kept cutting more of the time with fewer breakdowns.
- With latest improvements, the Wilcox Miner will exceed 200 tons per shift with 3 men at the face—in 36" coal under average conditions.
- Cutting height adjustable 25½" to 41" high.
- Has been tested in several types of coal (30" to 42" high) since January 1955 and the results have been very satisfactory.
- We invite you to visit our plant, also you may see the Wilcox Miner in operation by appointment.

60-day guarantee on defective parts. Present delivery—schedule 3 to 5 months.

WILCOX MANUFACTURING COMPANY

P. O. BOX 217 • RALEIGH, WEST VIRGINIA

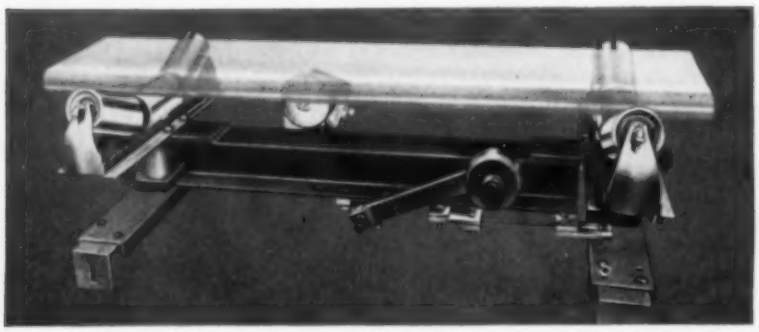
Phone 25373 or 25374 — Beckley, West Virginia



Weigh it on the run ...with electronics

There are no labor costs to be charged against weighing when you incorporate a Fairbanks-Morse electronic scale in your belt conveyor system. The belt will be moving anyway, and might as well be accumulating the record of passing weight in the process.

Because it is electronic, the registering instrument of the new Fairbanks-Morse Electronic Belt Conveyor Scale can be located remotely—for instance in the office with the rest of your business and accounting machinery.



Accumulated weights are read on the remote instrument in digital figures, and there are other indicators to give you a running check on the general efficiency of your conveyor operation. A meter shows percentage of load at the given moment; another shows the rate of tonnage movement per hour.

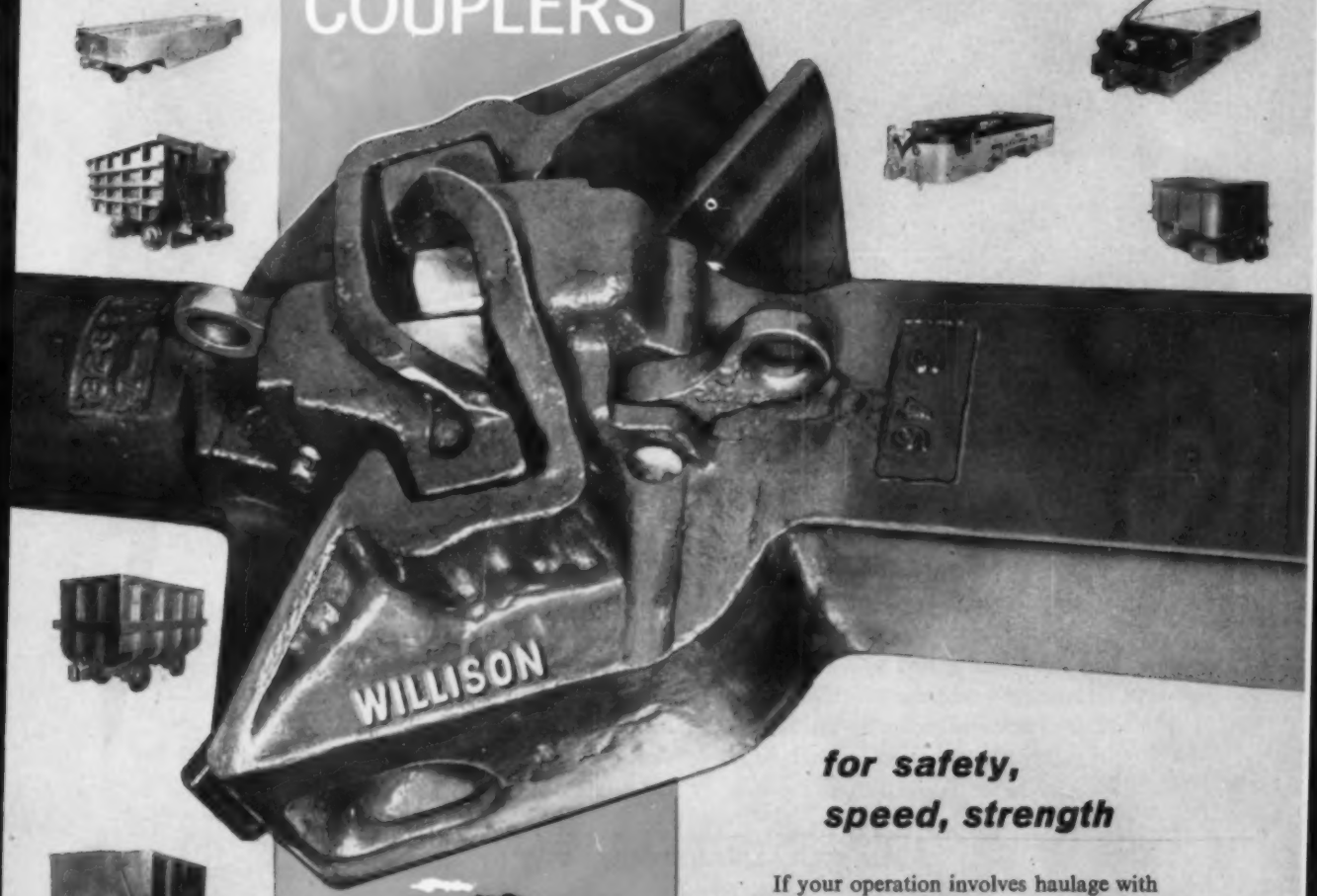
There's a new bulletin, No. ED-12, on the Fairbanks-Morse Electronic Belt Conveyor Scale. Please write for it today. Fairbanks, Morse & Co., Dept. CA-11, 600 South Michigan Avenue, Chicago 5, Illinois.

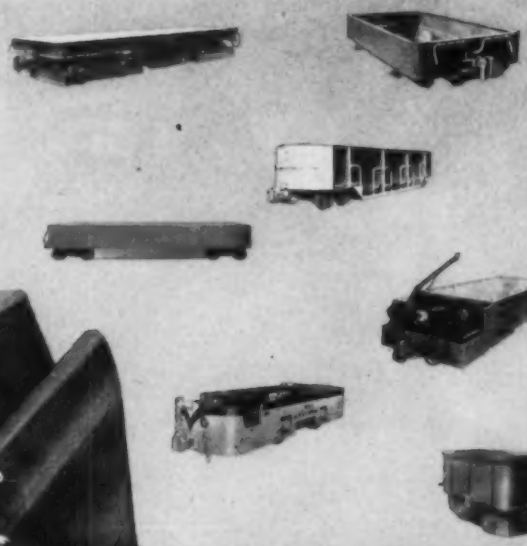
FAIRBANKS-MORSE

a name worth remembering when you want the BEST

SCALES • PUMPS • DIESEL LOCOMOTIVES AND ENGINES • ELECTRICAL MACHINERY • RAIL CARS • HOME WATER SERVICE EQUIPMENT • MOWERS • MAGNETOS

WILLISON
automatic
COUPLERS





for safety, speed, strength

If your operation involves haulage with locomotives and cars in the 1 to 30-ton range, it will pay you to investigate the advantages of Willison Automatic Couplers.

Willisons are *Safer*—because they couple automatically... *Faster*—because they're self-aligning... *Stronger*—because they take the full buff and pull forces without depending on intermediate parts.

Over 100,000 Willison Automatic Couplers are in daily use in mines, industrial plants and foreign railroad service because they're *safer... faster... stronger.*

AA-0000

NATIONAL MALLEABLE and STEEL **CASTINGS COMPANY**

Established 1868 — Cleveland 6, Ohio

WILLISON AUTOMATIC COUPLERS • RUBBER CUSHIONED UNITS
MINE AND INDUSTRIAL CAR TRUCKS • NACO STEEL WHEELS
NACO STEEL LINKS AND SWIVEL HITCHINGS

THE SQUARE KNOT shown is used *only* to lengthen a *trunk* line of Plain or Reinforced Primacord — above ground. It must be drawn up *tight*.

He's tying in another acre of good digging

His holes are laid out in a pattern to obtain the best break-up with respect to the open face, or the most logical direction of the movement of the bank. They're loaded and primed with Primacord, the insensitive detonating fuse. A trunk line of Primacord connects all holes in a planned firing sequence which will promote better fragmentation.

So — he can shoot a few holes or a few acres with one detonator. And he can fire when ready, because Primacord is insensitive to ordinary shock, friction, sparks or stray electrical currents — and even a direct hit by lightning failed to detonate it. Available in Plain, Reinforced, Plastic Reinforced and Plastic Wire Countered.

Ask your Explosives Supplier, or write to

THE ENSIGN-BICKFORD COMPANY

Simsbury, Connecticut

Primacord • *Quarrycord* • *Ignitacord®* • *Safety Fuse*
Blasting Accessories • *Established* 1836

PRIMACORD

The Proved and Approved DETONATING FUSE

Devoted to the Operating, Technical and Business Problems of the Coal-Mining Industry

Coal Age

NOVEMBER, 1956

IVAN A. GIVEN, EDITOR

Worth Fostering

IS THE COAL INDUSTRY really entering into a new era in operator-union relationships? Certainly, there are some differences from things as they used to be. As an example, the raising of wages and fringe payments almost $5 a day in a span of two years could be considered somewhat of a departure from past patterns, not to mention the fact that these increases were proposed and agreed upon with hardly a harsh word, let alone strikes, strife and recrimination.

Pride and Warning

Officials of the United Mine Workers did a little bragging about these increases, and about the standing of the mine workers in the hourly earnings column, particularly as compared to the auto and steel workers, at the 42nd Constitutional Convention last month in Cincinnati. But these officials seemed also to be increasingly aware that at these wage levels things should be a little different from the standpoint of miner and union responsibility. As an instance, even the proverbial Dutch uncle could not have been more forthright than Mr. Lewis in laying down the law to the delegates on wildcat strikes and other unauthorized interferences with production. Heavy fines against the locals were the least of the penalties already imposed and promised for future transgressions.

Pattern and Departure

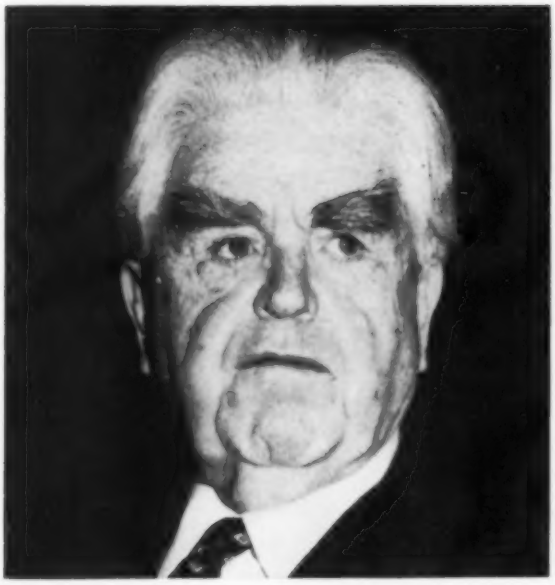
True to pattern, there was the customary recital of past wrongs, real and fancied, but the recital lacked much of the fire of other days; likewise the restatement of basic suspicions of operator motives. Aside from that the departure from past procedure was evidenced, among other ways, by the fact that the operators would have found a large majority of the reports and addresses on industry problems practically identical in language and conclusions to presentations at their own meetings, aside from the fact that some were the product of joint effort. Basic differences were few.

Share and Shake

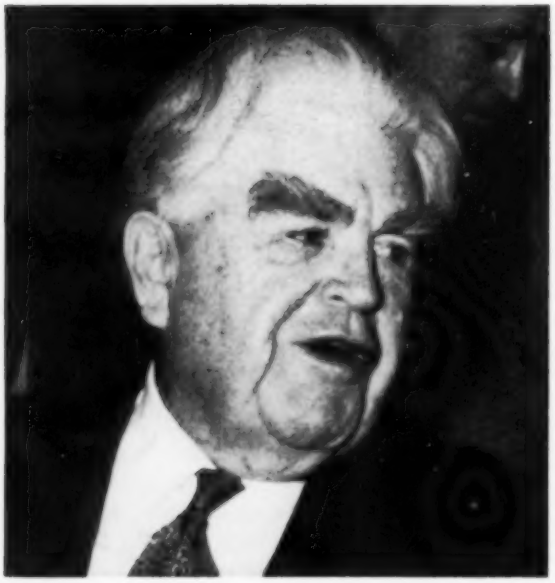
All in all, the union, in the persons of its officials, gave every appearance of being intent on seeing that the coal operator who spends his money to raise efficiency gets a fair shake in return for what the union considers its rightful share of the benefits of such efficiency increases. Even though the fairness of the shake necessarily is a variable, reflecting, among other things, inherent mining conditions and access to markets, the fact that there is now a more clearly defined policy to that effect is a welcome development. With such a policy, and with growing demand in the future, it might be hoped that the mortality normally following accentuation of the cost differential by increases in wage rates will turn out to be not unduly high.

Parallel and Progress

It is logical to conclude that a new era in opportunity should be paralleled by a new era in labor relations, especially since a closer approach to solid teamwork means a maximum of effectiveness in the solution of industry problems, with corresponding enhancement of the benefits to all parties. With full agreement as to the future of the industry as a supplier of energy and raw material, and also as to the methods that can be employed to convert the potentialities into the maximum in business, development of that teamwork is more natural than not—and more worthwhile. It is a pattern and a principle well worth fostering in the days to come.



Times have changed, and that change reflects the steadfast adherence of the union to its basic principles.



This contract represents all that the industry can pay at this time. There isn't any more to be had.

How John L. Lewis Sees It . . .

The UMWA—Sound financially and otherwise, and more influential than ever in the collective-bargaining realm.

The Industry Outlook—A long period of active production ahead reflecting progressive increases in consumption.

The New Contract—All that the industry is able to pay at this time.

The Miner's Responsibility—No wildcat strikes and a full day's work for a full day's pay.

(Excerpts from addresses at the 42nd constitutional convention, United Mine Workers of America, Cincinnati, Ohio, Oct. 2-10)

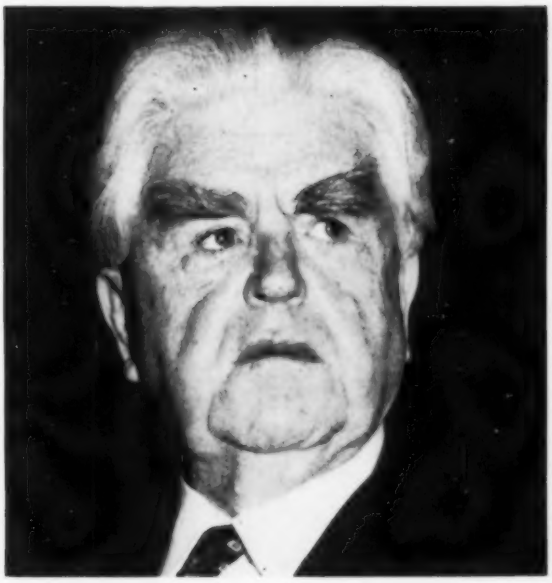
THE UNION TODAY

You will find that our union is sound; that its financial reserves are undiminished; that its influence in the realm of collective bargaining in the industry has increased; that it is supporting those issues of public importance that run to the well-being of the great mass of our citizenship. And you will, I hope, find that your officers have worked diligently to carry out the mandates of our organization. Better than that no servant can do.

Our industry has been progressing constructively in the last several years. Its processes have been improved. Its cost of production has been lowered. It has extended its markets, and any reasonable analysis of the facts will indicate that the industry is in for a long period of years of active production under more modern and improved methods than ever before has been true in the history of the industry. The consumption of coal in our country and elsewhere will progressively increase in the years to come.

Atomic power is many years removed from competitive usage—on the cost factor—with coal. The vast increases in

Coal is moving forward, economically, to a new day of increasing production with modern facilities.



The new contract is worth hundreds of millions. It is highly necessary that it be kept in full.

the population, both in our own country and elsewhere in the populated world, are so phenomenal that when parity as to cost between atomic fuel and coal comes—if it ever does—atomic energy will be limited to serving only part of the power requirements of this greatly expanded market.

So, it behooves the coal industry to prepare for the future. Great consolidations of modern capital are taking place in the industry, and they are highly beneficial, and in the modern sense are more efficient—better for the men who work in the mines.

We still have the problem of the small mines up the hollows, scattered here and there. Unfortunately, our Congress refused to bring mines employing less than 15 men under the provisions of the Federal Mine Safety Act. So those mines naturally try in every possible way to avoid paying the industry scale and maintaining industry conditions or paying their welfare royalty . . .

We also have on the perimeter of the industry the Tennessee Valley Authority, a great power concern—a government enterprise operating on taxpayers' money for which they do not pay interest or amortization, and we find that the Tennessee Valley Authority is dedicated to an anti-social sweatshop policy of being opposed to collective bargaining, as long as they can get it from a little hole in the hills . . . Your organization is working on that and gradually hopes to reform even the Tennessee Valley Authority by constant effort . . .

THE 1956 CONTRACT

Negotiation of this agreement is another great triumph for the United Mine Workers of America, a tribute to its strength and a tribute to its constructive policies. It represents a dividend, another dividend in the long history of intense struggle and personal sacrifice on the part of our people through years of adversity and facing the tremendous odds of concentrated opposition. It comes at a time when the industry is moving forward, economically speaking, to a new day and guaranteeing operating in the future under more modern policies, yielding unto Caesar that which is Caesar's and recognizing the right of the United Mine Workers of America to live and aid by its strength and constructive practices a modern industry to go forward, participate in our economy under our system of free enterprise where invested capital is entitled to a return on that investment, and where the mine workers who produce the coal are privileged to participate in the modern advances of the industry and the increase of the per man per day productivity of the industry.

It is a dividend upon the policy of our union adopted some decades ago when we highly resolved to encourage the modernization of the American coal industry, in contradistinction, if you please, to the mine workers' unions of other countries which have opposed and fought modernization and modern advances to the point where their productivity is now so low in tons per man employed that those industries are economically depressed, incapable of volume production, and are failing to sustain their home economy.

Years and years ago the United Mine Workers said that God did not place an idea in the mind of any inventor who might be able to devise a machine that could do the work of 10 men, or 100 men, for the sole advantage of the man who invented the machine or the sole advantage of the coal operators who were capable of buying the machine and operating it; that there were three parties who should profit from and participate in the advantages of that invention or that device: the operator who invested his money therein; the coal miner who did the work of operating the machine and produced the coal with the machine which the machine made possible; and the public at large and the consumer who profits by having coal mined in a modern way with a cheaper cost per ton. That has been the story as the scroll has unrolled.

For decades of time many of the coal operators of this

country continued to look forward in the hope and the belief that in some way this Union might be destroyed, so that they might prosper by reducing wages and debasing labor rather than tax their brains with the problem of recognizing the rights of the mine worker and paying that wage which is required and necessary to maintain the family and home of a mine worker in accordance with our modern concepts and standards . . .

That time has changed, and it was only changed by the unceasing efforts of this Union on behalf of its members, in times of stress and trial, sometimes covering a period of years, like in the 40's, when we had no friends in high places in this country, when everyone was against us except our own people. Through our own strength we triumphed; through our own strength and the virtue of organization we have educated the American people to understand, and thereby the businessmen and industrialists of this nation, to know, that mine workers are human beings and that they will ever fight to the last vestige of their strength for their proper participation in this economy, this magic economy of ours under the American Flag.

So it comes to pass in this year of 1956 that the investors in the coal industry, represented by the operating heads of the great corporations, the Republican Party, the Democratic Party, the Congress and the courts recognize that they cannot, if they will, destroy the United Mine Workers of America . . .

THE CHANGE IN RELATIONS

I do not want to dwell in the past or bring up the heartbreaks of yesterday. I merely mention these things in order that we might keep our sense of values and proportion a little more accurate and be able to judge by contrast and have a greater appreciation of things as they are when it comes to pass that we can negotiate a contract, a good contract, a fair contract, in the mining industry with the more intelligent leaders of that industry on the operating side without having to beat the war drums and mass the troops and go through long months and sometimes years of constant turmoil and savage industrial conflict.

This contract encompasses all that the industry is able to pay at this time. There isn't any more. If there was, we would get it.

So, there isn't any more. It is all there, wrapped up. If you look at it long enough, you will find it is good. Your officers know something about this industry. We know the status, the financial standing and the market possibilities and the operating costs, and can project them far to the future, of any major coal company in this country. So we are equipped with the facts when we talk with them.

I think it is a tribute to the present leadership of the Bituminous Coal Operators' Association that they are willing to assume the responsibility of amending the existing contracts, supplemented with this gratifying wage increase, without the firing of a shot—and I mean that in an oratorical sense—just for the benefit of the newspapermen; without giving notice of 60 days under the despicable slave law, the Taft-Hartley Act; without trying to get themselves an injunction; without trying to have the President hamstring the United Mine Workers of America; without having Congress adopt its own resolution of denunciation. They are cutting out the red tape and they are dealing with us direct . . .

It augurs well for the future. For 6 yr now there have been no major stoppages in the industry, and for an indefinite period into the future that will continue, providing the leaders of the industry on both sides continue to exercise that discretion and judgment which they have now exhibited that they possess. I suppose they had it all the time but wouldn't use it. The industry and the public interest will be served by this abatement of national conflict in the coal industry. It is giving the industry time for reorganization of its productive and marketing policies and practices. It is making possible larger combinations of operating units in the country, which is an end greatly desired, to find other ways in lessening the cost of production besides reaching down into the pockets of the coal miners and extracting it from them.

These great combines now being formed in the industry are able to save enormous sums of money in the production of coal, in the buying of supplies, on the part of managerial ability and administration, in the reduction of idle-day time because of their ability to make contracts with the great power-consuming and manufacturing industries of the country and deliver on schedule, enabling them to plot their production with the maximum number of days of operation per year, and cutting out the unnecessary idle-day drag that mounts the cost of production.

This maximum usage of the tools and the productive facilities now requiring greater and greater cost and the rising productivity per man employed, the increasing number of tons in payment for one day's work for one man, has lowered the unit cost of production, so that substantially in 1955 and 1956, despite the repetitive wage advances we have received since 1950, the cost of the coal in this country f.o.b. the mines is lower than it was in 1948. That is modern operation. That condition is one which I think the industry now in its major sense is dedicated to continue—the practice and the policy that is making possible a more satisfactory operation of the industry and an intensely more satisfactory relationship between the men who mine the coal and the men who sell the coal.

THE WORLD FUEL PICTURE

I might say in passing that the entire civilized world now is seriously concerned with the future of their fuel supplies because of the political turmoil in the countries of the Near East. The great volume of oil from nature's pool, while sustaining the economies of some countries, makes them increasingly fearful that, independent of the Suez Canal conflict, the teeming populations of the Arab World will some day nationalize those oil deposits and the facilities and fix their own price on what the Western World requires of that oil.

The vast increase in population, both in our own country and throughout the entire world is a phenomenon that contains grave portent for the future, because these teeming populations, now numbering at least 2,600,000,000 people in the world, are clamoring for participation in the bounties of this world, in the natural resources, and they are dreaming of a higher standard of living, with more shelter, with more food, with more medical attention, and a longer life to live, just as our people dream.

It might surprise some of you to know that the life expectancy of hundreds and hundreds of millions of these people in these congested foreign countries is only 29 and 30 yr. They are born in misery, poverty and degradation and they die at the average age of 29 and 30 yr, which is just the same life expectancy as existed through centuries in ancient Rome. So they are clamoring for enough to eat and a diet that will sustain their health, and they are clamoring for medical attention that will prolong their lives. They are clamoring for the things that we tell them we have through our mutual-aid program.

Some of those great masses may overflow the political boundaries of the nations in their quest for life and some

degree of happiness, creating jeopardy and troubled conditions in the relations of all nations.

THE AMERICAN WAY

Under our flag we have created and fabricated an intricate, modern economy, the like of which the world has never before seen, going beyond the dreams of the leaders of society through the centuries that have gone by. It is true that the average American today lives a better life and enjoys more luxuries, if one would call a necessity a luxury, than the medieval kings of the past. But that is the right of free men, to enjoy that which they create.

The life expectancy in America has gone up through the wonders of modern medicine and its facilities here in America beyond a point existing anywhere in the civilized world. But the world's population is dreaming of those things. They are dreaming of expanding their economies, of fabricating those things they can use, and there is a shortage of world power and world shortage of coal. Segments of the coal industry in which we are participating are devoting themselves toward increasing the coal export of America for two reasons: To permit those who wish coal for their economy to have it available and to add to the prosperity of our own coal industry.

The United States of America and the Dominion of Canada, where our organization extends, are the only current coal-exporting nations in the world. No other country can export coal in volume to any other country because they are incapable of producing enough coal in their own mines to serve their own economies and their own domestic needs. That is true of the United Kingdom, which for decades of time was the mightiest coal-exporting nation in the world.

England cannot export coal except when she sends a stray cargo occasionally to build up her exchange in some particular country to buy something else. England did not modernize her industry. Her coal operators took the profits from their investors' money and were content not to modernize. In fact, they opposed modernization. Then they nationalized their industry in despair and under nationalization they have not improved the situation. They have not increased their production. They have discouraged their manpower. They can't get men to work in the mines because the productivity per man per day is 1½ tons in contrast to the American level, which now approximates 11 tons per man per day as a national average.

The wages of the British mine workers are based on the values inherent in the sale by the British Coal Board of 1 ton of coal. That is the reason we have a wage scale here under which the operators produce coal at the pit head for one-third of the cost in England and pay a wage scale five times greater than the British wage scale. That is the result of your policies and the wisdom contributed by those who have preceded you in the councils of this organization.

This is the story, members of our Union. The United Mine Workers today, in a pardonable moment of satisfaction, are realizing the dividends arising from the policies adopted in the past and from the heartbreaking sacrifices and contributions made by those who have preceded us in this great struggle. They have raised the standard of living and widened the horizons of opportunity for the coal miner, his sons and his daughters . . .

KEEPING THE CONTRACT

We do not want our men to work when there is danger confronting them. We do want our members to observe the contract, and it is highly necessary to observe the contract and increasingly necessary to keep that contract. When a local union goes on strike in violation of that agreement, it places in jeopardy the other members of this union who may have to pay for the indiscretion and the offenses of the local union that ignores the contract.

It must be obvious to our members that their executive officers and scale committee cannot undertake to negotiate wage contracts in the coal industry in good faith as the law and statutes of Congress requires unless we can offer reasonable evidence that we intend to observe that contract when negotiated and executed. Those are simple facts of life. Those of our members who have with impunity been violating this contract in increasing numbers will have to find that out the hard way if they will not abide by the constitution and by the agreement . . .

I cannot speak too strongly of the seriousness of this problem. Between Jan. 1, 1956 and May 5, 1956, when the international executive board adopted its policy, 170 local strikes of major magnitude had taken place in the various districts. The amount of lost time, the amount of tonnage displaced, was of magnitude. Lawsuits of great moment were threatened by individual mining companies whose contracted deliveries were interrupted and who stood to lose those contracts for nondelivery. The international executive board at long last decided to do something to protect the men who were observing this contract and living up to the laws of this union. . . .

This convention this week ordered me to attach my signature to an enormous contract worth hundreds of millions of dollars to our people, which I did last night. Do you think the board is going to permit that contract to be dishonored after having been approved, after full discussion by a constitutional convention representing all of our great membership in whatever jurisdiction? If you think so, you better vote against me in this coming election because that is going to be my policy . . .

THE MINE-WORKER CREDO

It has been one of the ambitions of those who represent you in official capacity to make the pay of the mine worker higher than the pay in any other industry in the United States. Why? Because we toil and work in an industry that is rugged and filled with hazards, and the work is hard and the dangers are great, and the price our people pay in impaired health and injuries is a savage, barbarous price. It takes a toll upon our membership annually, and if the American people needs must have coal to operate our modern economy, it is right and proper that they pay for that coal a price that yields a wage scale commensurate with the services rendered and the duty performed. And the price of coal, whatever it may be, must bear the cost, not only of the production, but the price also of serving the manpower of the industry in the days when they are unable to produce coal.

That is the basis upon which our Welfare Fund is founded. That is the basis upon which we refused the demands of the coal operators to make the Welfare Fund dependent upon the pay roll, because we knew that with the increase of productivity, the lessening of the manpower as of today as against years ago, numerically speaking, that more money would constantly be available to do more things and to make the fare better for the men who are obliged to remain in the industry and mine coal in order that the social and economic life of the nation might go on toward its logical goals and objectives, and that society as a whole might be kept warm and comfortable because coal miners go into the bowels of the earth and hazard their lives and their fortunes to produce that coal.

So, in comparison to any other industry, we believe that above all the mine workers must be paid the most. They must be paid the most. And let those who deny that fact offer themselves to mine a little coal.

SINGLE POSTS with wedges, here supplementing top coal, are the old reliables in face support. Posts, top coal or both provide protection for men and equipment where top conditions are fairly good and long open roof spans can be tolerated. Posts also are excellent for holding weight.

NEAR-CLAY TOP several feet thick was held in this loader-shuttle-car area by legs and crossbars with a moderate amount of lagging. Fast extraction was one secret of economical production in an area that could not have been mined by slower hand methods.

CROSSBARS increase the roof area actually supported and therefore provide more coverage where the top is poor. This illustration also shows the use of jacks for keeping support right up to the face. They are replaced by legs as the face advances.

Holding Top at the Face

Four major types of top material—near-clays, shales and slates, coal, and sandstone and limestone—provide varying degrees of natural strength, and are subject in varying degrees to the effects of moisture and temperature changes. Types of clays found in shales and slates largely determine resistance to deterioration.

Major objectives in the development of support plans are reduction of the open roof span and necessary support of weight, while preserving sufficient room for coal production activities. As the natural strength of the top material decreases, single posts or bolts are supplemented by headers and bars for greater roof coverage. The ultimate is a form of portable support completely covering the top area.

Proper installation insures realization of the full effectiveness of support, whether posts, bars or bolts.

What have I got?
What am I doing with it?

The heart of effective roof control at the working face lies in the answers to these two questions. Unless the nature of the material to be held is fairly well known, including its deviations from the average, especially on the bad side, it is difficult to arrive at the most-effective support system. When the answer to this question has been determined, it then follows logically that a certain system of support will provide the maximum in effectiveness at a minimum in cost.

With due appreciation of the parts played by carelessness and other human failures, the fact that the character of the top and the support system are not always matched is evidenced by the continued high incidence of roof falls, with attendant injuries and fatalities. Consequently it becomes appropriate to set down once again the "Big Three" in roof-support principles:

1. **Know your top,** and particularly how it deviates from the normal or average.

2. **Know your roof supports**—the various types and the supporting characteristics of each.

3. **Match support characteristics with top characteristics** to get the maximum in control effectiveness.

TOP CHARACTERISTICS: Frequent Variations the Rule

The one sure thing about mine roof, with very few exceptions, is that it never stays the same. The changes may be gradual, as from one side of the mine to the other, or they may be abrupt, as when a slip, horseback or kettlebottom is encountered. In addition to the variations in the nature of the material as it was laid down, changes in top characteristics also may result from exposure to air or moisture after the coal is removed. Usually such changes are more noticeable in longer-lived permanent or semi-permanent openings, but with certain susceptible materials rapid changes may occur when the coal is removed at the face.

Slacking as a result of drying out is one such change. Contrariwise, depending upon the specific constituents of the roof material, moisture also can result in moderate to severe changes in top characteristics. Recent research indicates that the type or types of clays present in shale or slate roofs are major factors because of the way they react to moisture. Where the clays are predominantly kaolinite, good crystalline illites and chlorite, exposure results in little change in top characteristics from moisture alone. But where moisture is present along with montmorillonite or mixed-lattice clay minerals the top may be seriously affected, with resultant cracking and falling ("Properties of Clay as Related to Coal Mining Problems," W. Arthur White, Associate Geologist, Illinois State Geological Survey, *Proc. Illinois Mining Institute*, 1954).

Alternate wetting and drying may accelerate the deterioration of some types of roof, and temperature changes, particularly from warm to cool and back, may have similar results. Therefore, when deterioration of the top beyond what might be considered normal occurs, temperature and moisture should be checked to see if they are involved.

Classification of mine roofs necessarily cannot be precise, but a rough grouping is as follows:

Near-Clay—Although relatively infrequent, some top in coal mines is almost clay in nature, with other degrees of softness up to shale or slate. Strength tends to vary accordingly, and if the wrong types of clays are present moisture complicates the problem. Holding such top normally means installing additional support up to complete lagging, forepoling or skin-to-skin crossbars. Mining thus becomes uneconomical, unless the mine price is high or the clay is thin enough so that it can be taken down and loaded out.

Time is a factor, and if extraction is rapid and the near-clay has moderate strength and is not susceptible to moisture, it may be possible to recover the coal at a reasonable cost, as experience at some mines has proved.

Shale and Slate—The predominant type of immediate roof in U. S. coal mines is shale, slate or a combination of both, with slate the most common. The variation in quality and strength is almost infinite, with some requiring very close timbering and some so good as to require nothing more than safety posts and jacks to guard against the unexpected. Between these extremes is the common slate or drawslate top requiring "normal" support in addition to safety posts and jacks.

Shale and slate may or may not be affected by temperature variations and moisture. Even if they are the rate is such that the effects seldom are a factor in face operations, though they may require special measures in permanent or semipermanent openings behind the face—and occasionally at the face as well.

Coal—An old standby as a top material in many mines is coal itself. It may

PLANK-TYPE CROSSBARS, applied with bolts in this particular instance, increase headroom while decreasing open span between supports in poorer top. Keeping last plank at the face provides maximum in protection.

SHORT HEADERS increase the area of support actually against the top and thus reduce the open span where top conditions are less favorable. Installation with bolts clears the working space of obstructions, but care is necessary to prevent excessive loss of bolt tension and holding power.

be regular-quality material left as the most-economical and reliable method of protecting against poor top, or it may be substandard material which would lower the grade of the regular product. Coal usually has surprising strength either alone or with the help of a minimum of supports, and has the further advantage of sealing the top against temperature changes and moisture.

Sandstone and Limestone—Sandstone or limestone is found directly over the coal in relatively few mining areas. Where it does occur, it tends to be thick and strong, simplifying the support problem though sometimes complicating the problem of breaking the top in pillaring. Poor or weak sandstone or limestone is the exception rather than the rule.

Rough though it is, the preceding classification is rendered still rougher by variations introduced by cracks, cleavage planes, slips, horsebacks, kettlebottoms and the like. An added complication is the effects of weight, which may change a good top into a poor one and aggravate the support problem. These are additional reasons for everlasting care with top, including inspection, testing and ample support properly installed.

TOP SUPPORTS: Coal, Timber and Bolts

Regardless of the type or types of supports chosen for the job of holding the top at the working face, they must accomplish two main objectives:

1. **Protect men—and equipment**—from falls, crushes, bumps and other top failures. Similarly, other support is necessary at times to protect against falls of face and rib, which are additional hazards though not to the same degree as falls of roof. Protection of men is, in fact, the overriding goal, since the other objectives of support

BROKEN ROOF, as in second and third mining, requires special measures, such as, this forepoling job in one anthracite mine, which is economically possible only because of the higher price of hard coal.

could frequently be achieved with much less or none, as is now the case with remotely controlled continuous-mining units.

2. **Keep working places open** for the desired length of time. If only solid work is done and pillars are left, one type of support will be adequate. If pillar extraction is practiced, another system designed to cope with greater weights and stresses may be necessary. It is seldom, however, that keeping working places open is the deciding factor in the choice of a support system since protection of men is the first consideration and a system that will provide that protection usually will be more than adequate to keep working places open as long as required.

The major types of supports now available and their characteristics are:

Top Coal—Available (a) where leaving the desired thickness would not reduce working height below the minimum and (b) where its value as a support would be more than its value in the market. Coal is fairly reliable as a support but cannot be trusted completely without supplementary timbering, which tends to increase the cost.

Pillar Coal and Stumps—Probably the earliest of all types of supports, along with single posts, was coal itself, either in the form of large thick pillars or small stumps. Examples are the old familiar pocket-and-stump or pocket-and-wing plans. Newer, perhaps, are the so-called fender plans, in which a narrow strip, say 2 to 3 ft, of coal is left against the gob. A variation is the sawtooth fender, in which the quantity of coal left is reduced by gripping the cutter bar out on the gob side each cut to form the sawtooth.

Where much weight must be contended with, as in pillar extraction, coal in pillars, stumps or fenders is one of the most effective of all forms of support. Whether it is the most economical depends on how much is left or, if recovery is contemplated, whether such recovery can be accomplished without undue expense for special timbering and undue risk to personnel or equipment. In other words, leaving or losing excessive coal or spending extra money to get out stumps and fenders can convert advantages into disadvantages. In addition, failure to clean out stumps and fenders can result in trouble on the pillar line from squeezes and other disturbances, with consequent increase in cost and hazard. However, it should be noted that the exercise of ordinary care in designing the pillaring plan and carrying it out in practice usually is all that is necessary to get full recovery with little or no difficulty. It also should be noted that coal is not a complete substitute for timber, which normally must supplement coal for protection as well as for weight-carrying purposes.

Single Posts—Aside from coal itself, single posts probably were the first support employed in underground mining. A necessary adjunct to the single post is the wedge. Without it, it would be impossible to install the post to prevent the roof sag which is the beginning of most of the troubles encountered with top at the face. In addition to converting the post into a load-bearing unit immediately upon installation, the wedge also serves as a means of locking the post against sidewise blows or pressures. Also, where subsidence occurs, the wedge yields and postpones the time when the post finally fails from weight.

Advantages of the single post and wedge include simplicity and low cost, ease of installation, no reduction of headroom, and adaptability to cutting and fitting on the job. This is not to infer that posting is an unskilled job. Good timbering, even with single posts, requires training and experience. Aside from limitations on its ability to hold top, to be discussed in the next paragraph, disadvantages of the single post include bulk, which makes for more labor and cost in receiving, storing and handling. Single posts are relatively easy to knock out accidentally and also are susceptible to being kicked out when slabs of rock caught at one edge begin to come down.

The holding power of a single post is almost completely dependent on the type of roof. If the top, for example, is a near-clay, it logically follows that about all that the post can be expected to support is the area covered by the wedge. As the material becomes harder and more able to support itself, the area that a single post can be expected to support increases, provided that area does not contain any cracks or other defects. If it does, posts must be set directly under the slab, kettlebottom or other loose section, unless it is taken down or some other form of support employed.

Where the aim is to protect men and equipment against accidental falls of top in solid work, as distinguished from pillaring, single posts usually are set on 4- to 6-ft centers, sometimes more and rarely less. This means that the top should be good enough to support itself over such spans, except for areas with defects requiring special or extra posting. Otherwise, management and men are taking a chance.

In pillaring, considerably greater weights and stresses are to be expected, with the result that additional timbering is required. With single posts, the size of the post is

increased, the centers are reduced or the posts are set in clumps, particularly where the aim is to break the fall at a specific line.

Roof jacks are a special form of post. They are designed for rapid installation and moving, and thus lend themselves to protective use in the face zone where the greatest hazard exists.

To sum up, single posts are a tried, tested and economical form of support, but for maximum protection require assurance that the top will support itself over the span between the posts, and also require that both management and men be sure that defective areas are discovered and taken care of specially before falls occur.

Cap Boards, Short Headers—As the natural strength of the top decreases, more of the top area must be directly held by the support. One answer is decreasing posting centers, but the disadvantages are immediate and obvious: higher cost and not enough room to work, travel or move equipment. A logical step is to put something on top of the post to bear against more of the roof.

Cap boards and short headers are some of the answers, and permit retaining fairly wide post centers while affording the necessary support in poorer top. There is an additional expense for material and timbering labor, but it is less than the cost of extra posts plus the added inconvenience resulting from greater interference.

As with single posts, care must be taken that the span between cap boards or headers will support itself and that defects are given special treatment.

Crossbars—Posts, even with cap boards or short headers, still must be set on fairly short centers, with consequent interference with the movement and working of men and equipment. Also, as previously noted, they are fairly easily knocked out and their direct coverage of the top to be supported is limited.

The crossbar is a partial answer to these problems, since it reduces the number or eliminates single posts completely and thus improves clearance. Crosswise of the place, it increases the area of top that can be caught directly by the support, though the span between bars still is there and must be kept down sufficiently to make sure that the top, except where defects are present, will stay put.

The longer the span the heavier the crossbar must be to hold a given weight. This means that if fairly heavy top must be supported over wide openings the bars must be big and expensive. Alternatives are metal bars, such as, steel, aluminum and magnesium, all of which are much more expensive and thus must be re-used over and over to cut down cost. Aluminum and magnesium are light in addition to providing strength, which facilitates their use in the face zone. A popular system is to have 2 or 3 such bars in each place, which are moved ahead each cut and replaced by standard posts or bars.

Bars require headroom, which restricts their use in lower coal—and sometimes even in high. Alternatives are planks which can support a surprising thickness of top without breaking. Substitutes for planks that have been used or suggested are light channels and corrugated or specially rolled steel strip.

In face work, it ordinarily is necessary to set bars on legs or catch them with bolts. Holding them with bolts eliminates the problems encountered with legs, including the possibility of their being knocked out accidentally with the attendant hazard of a heavy fall. Hitching is another method of eliminating legs, but normally is more costly and thus is restricted to permanent or semipermanent openings. Where top cutting is done, however, it sometimes is possible to grip out on either side to form slots into which the bars can be laid.

Cribs—Greater supporting power and also greater actual coverage of the top are characteristics of cribs. However, the cost of the material is greater, and also the cost of installing. Consequently cribs are relatively little used in face work, except where conditions are right. These conditions include major weight, as under heavy cover, and also the character of the main roof members—for example, the presence of thick sandstone or limestone. They also include protection of men and equipment while getting out the last of the coal in pillars. Thus, for example, cribs may be erected on each side of a continuous miner while it is taking out the last stump on the corner of a pillar.

Open-ending also lends itself to the use of cribs, although clumps of single posts are one substitute. Special plans also have been developed for areas of heavy weight. One mine, for example, sets cribs against the gob on two sides of a block so that major support already is in place even before the first lift is started.

Roof Bolts—Normally, bolts accomplish the objective of keeping top up by locking a number of thin weak layers of material into a thicker stronger layer. Bolts also are used to hang loose material from stronger upper layers, but this is an infrequent application because it is less effective. The effectiveness of bolting is proved by the numbers being installed. However, like most of the other forms of support previously discussed, bolting necessarily leaves open spans. Its major advantage is that these spans usually are stronger than with other forms of support. And like single posts, bolts may be supplemented by short headers, channels, or long bars of wood or steel (corrugated or specially rolled) to get more coverage in bad top.

Bolting is more flexible, and provides the maximum in working-place clearance, with the result that operating efficiency normally is significantly higher where bolts are employed. Compared to wood, bolts are far less bulky and consequently are much easier and more economical to handle and store. Cost of bolting frequently is more than the cost of regular timbering, but is being reduced, with the result that at some mines, bolting is actually more economical.

Next Step?—All of the support methods previously discussed result in unsupported open spans of varying areas up to the full width of the opening where top coal is not supplemented by timbers. That open area is not the only problem in support, but it is a major one, especially in the critical 20- to 25-ft area back of the face.

Methods of decreasing the open area include lagging and wire netting held by roof bolts. Cost is one major disadvantage, along with the fact that supporting power is more or less limited. Also, since installation is complicated and time consuming, there is more opportunity for slipshod work or complete omission of the protection at times.

The ideal in face support might be described as a system that is placed automatically or nearly automatically, that completely covers the top, and that has the necessary strength to protect against any falls that might normally be expected. Various suggestions for a support of

this type, including one by *Coal Age* in March, 1945, and other similar ones that are now being considered by various organizations, including the Bureau of Mines and the UMWA. The *Coal Age* suggestion was for a light framework on skids with a wire-mesh top.

Perhaps such a mobile face support may be developed, though it probably cannot be designed to fit all mining conditions encountered in thick and thin coal, solid work, pillaring, and so on. And if remotely controlled machines become widely used, which can be expected as mining progresses, there will be less need for men at the face and therefore less need for support for their protection.

SUPPORT EFFECTIVENESS: Proper Installation Vital

There are at least two cardinal principles in the achievement of good support of top at the face and elsewhere:

1. Support is not support, unless it is in the right place.

2. Support is not support unless it is properly installed.

In view of the cost of support materials, not to mention the cost of falls as a result of omission or improper installation of supports, careful re-study of these two principles is a must.

Standard Plans—Years of experience have proved that the vital element in attaining maximum support effectiveness is a standard plan rigidly adhered to. The first step in the development of a standard plan is a careful study of the top. With these data a plan can be developed that will provide the maximum in support at the minimum in cost.

Frequently, such a study and development program can reduce the number of supports required by improving the placement pattern. Of course, no reduction in number of supports should be accepted unless it is completely clear that men and equipment are not jeopardized. However, one less post or bolt per cut means a reduction of up to 10c or more per ton. Therefore, if safety can be maintained, the rewards of a timbering study can be most worthwhile.

Overall, a standard plan is a must. Also a must is an understanding that additional support be installed whenever there is even a suspicion that roof quality has deteriorated.

Protecting the Face Zone—Because men and equipment must work at the face if coal is to be produced, and because at the same time the freshly exposed top is the most hazardous, the area within 20 to 25 ft of the face presents the major problem in support. The answers, pending the possible development of a mobile support system, are ample safety jacks and posts, and strict enforcement of regulations governing their use. The goal is the installation of supports on no less than the normal centers as soon as the coal is loaded —if not before. This degree of support must be maintained throughout all operations—cutting, drillings, etc. —involved in coal production.

Good Timbering—A vital consideration in timbering at the face is minimizing or preventing sag, which is where the trouble starts, particularly in solid work. This means that timbers must be installed as soon as possible after the coal is removed, and that they must be installed so that sag is eliminated or kept to a minimum. This applies regardless of the type, whether single posts, bars, cribs, bolts or what have you.

With single posts, the following are some of the rules for effective support:

1. **Cut posts the right length so** that they can be installed with one wedge driven home properly. If long, so wedges can't be driven as far as necessary, or short, so that extra wedges must be used, effectiveness is reduced.

2. **Provide proper footing** with all the end bearing on the bottom so that the entire cross section of the post is available to resist top movement.

3. **Match post size to length and weight.** Other things being equal, the longer the post the greater the diameter should be for the same service to avoid breakage under weight.

Good footing for legs under crossbars, and for cribs, is essential, as is establishment of proper points of bearing against the roof.

Good Bolting—As with posts, bars and the like, one aim with bolting in face work is to preserve the natural strength of the top by preventing sag and deterioration. Therefore, bolts, like timber, should be installed as soon after the coal is mined as possible.

Do's and don'ts in attaining good bolting include the following:

Check hole size and avoid overdrilling as a result of whip, worn bits, "dwelling" and the like, especially in soft material where maximum holding power is a necessity. Diameter gages are a convenient means of making such checks.

Where expansion-shell units are employed, check plug and shell position periodically by removing sample bolts to insure proper bolt anchorage.

Use caution with wood headers to make sure that loss in bolt tension is not excessive. Wood can dry out, yield under pressure and otherwise change characteristics with consequent loss of tension. Even with hard dry wood and 6x6-in plates, there is a significant drop-off in the first few days. With washers alone, the drop-off can be as much as 50% or more in a span of a few days. When green wood is used for headers, the drop-off is even greater. One moral is: always use bearing plates, never nuts alone or with washers, in installing headers.

Check tightening torque carefully. In hard material, up to 200 ft-lb may be employed. In soft material, under 150 ft-lb may be advantageous. Bolt-tightening equipment should be checked with a torque wrench.

Check tension on bolts in key areas occasionally since relaxation for a number of reasons may have occurred. Retightening may restore tension or replacement may be desirable.

Where maintenance of tension is a problem as a result of plastic flow of top materials, movement of top, and/or shrinkage of headers, if used, consider the advantages of the 5/8-in bolt. Studies by the Ohio Brass Co., for example (*O-B Haulageways*, September, 1956), show that the 5/8-in bolt has approximately 42% more linear deformation under tension than the 3/4-in bolt. Thus, if movement or other conditions reduce the stretch in both bolts the same, the tension in the 5/8-in bolt, and consequently its holding power, will be significantly greater after the reduction in stretch. Thus, the smaller bolt could be expected to offer greater resistance to sagging and separation of roof members after movement or other changes in characteristics. In addition, the overall cost of installation is appreciably lower.

In tightening bolts make sure that bolt head and plate are firmly against the top before tightening begins. Avoid galling and resultant waste of torque. Check that roof plates are level to avoid twisting bolt heads off at high torque.

RUBBER-TIRED SHOVEL moves in alongside crawler-mounted shovel to double the loading rate at this pit. The new shovel with two-way radio, makes it possible for the operator to respond quickly to calls for added loading capacity.

Stahlman Coal Co. banks on nimble equipment to achieve . . .

Flexibility in Stripping

"ADJUSTABLE" loading capacity at any pit is provided in this rubber-tired shovel, shown here on its way to help another loader.

Eight tips for increasing flexibility and coordination where concentrated stripping is not possible are contained in this account of how a growing Pennsylvania producer operates.

A HIGH DEGREE OF FLEXIBILITY marks the operations of the W. P. Stahlman Coal Co., Inc., Corsica, Pa., where the lay of the land, the desires of different customers and the come-and-go of the Lower Kittanning, Brookville and Clarion seams places a premium on nimbleness. Terrain in the Corsica-Clarion area is hilly,

eliminating the possibility of extensive tracts since the seams are cut off by the valleys. Furthermore, the area has been actively stripped in past years when the "crop" coal was relatively easy to recover and removal of deeper cover was not attempted.

The Stahlman enterprise, however, recovers about 400,000 tons per year under these conditions through the application of up-to-date equipment. But even more important than the equipment itself is the way in which it is used. The keyword is flexibility. As many as six different pits may be active in three different seams at the same time; customers may desire a product entirely from one seam or they may want a blended coal; or, the seam at any pit may thin out or plunge under excessive cover. The necessity for maintaining a nimble organization is obvious.

HOW STAHLMAN ACHIEVES FLEXIBILITY IN STRIPPING

Eight steps taken by the company to compensate for hour-by-hour changes in pit conditions are:

1. A number of stripping units of medium capacity are available to permit the operation of several pits. The major ones are one 6-yd Manitowoc 4500 dragline, one 12-yd Page 728 dragline, two 2-yd Manitowoc 3000 shovels and one 2-yd Lorain shovel.

2. All operations of the company are co-ordinated by a Motorola two-way radio system. Mobile units are installed in three Jeep station wagons, three haulage trucks, the draglines and shovels, the fuel wagon and two road graders. Other sets are installed in Mr. Stahlman's personal car and in a rubber-tired Unit loading shovel. The master set is in the office of Corsica. Thus all official and operators of critical machines are in constant touch with each other.

3. The most immediate benefit derived from the radio communication system is the opportunity it provides for dispatching haulage trucks "on the fly." Any sort of stripping or loading delay at any of the pits might result in having a number of trucks waiting for coal with consequent losses of operating time and production. However, this delay is minimized because trucks enroute to the pit may be diverted to other pits by direct or relayed messages.

4. This diversion of haulage trucks might overtax the capacity of the loading shovel at the second pit, were it not for the fact that Mr. Stahlman has an ace in the hole. This is a rubber-tired Unit loading shovel, also radio equipped, which can be shuttled at a moment's notice to the pit where it is needed most. Three other loading shovels include two crawler-mounted Units and a Lorain 75, all fitted with ¾-yd buckets. The rubber-tired shovel, therefore, moves in to reinforce any of the other shovels, or it can be used at a separate loading site. This flexibility in loading capacity also is valuable when the entire output must be provided from one seam.

5. Other equipment operated by the Stahlman organization includes four bulldozers which may be required for pit, road or reclamation duties at any of the pits. Since the pits may be several miles apart, a low-bed trailer is available for transporting the bulldozers and an International K-12 tractor for hauling the trailer.

6. Overburden preparation is let out on contract to the owner-operator of a truck-mounted drill. This relieves the coal company of the necessity of maintaining a drill and providing a crew in view of the fact that overburden preparation is not required daily.

7. Still another contributor to overall flexibility is storing raw coal at

W. P. STAHLMAN (right), Dean Rhodes and Clair Neiswonger (left) manage and supervise a number of widely separated stripping jobs near Clarion, Pa.

TWENTY YEARS AGO W. P. Stahlman completed his studies at high school and went to work for a highway contractor. As soon as his savings permitted, he made a down payment on a truck, and he has been in business for himself every since, interrupted only by his term of service in the U. S. Navy during World War II.

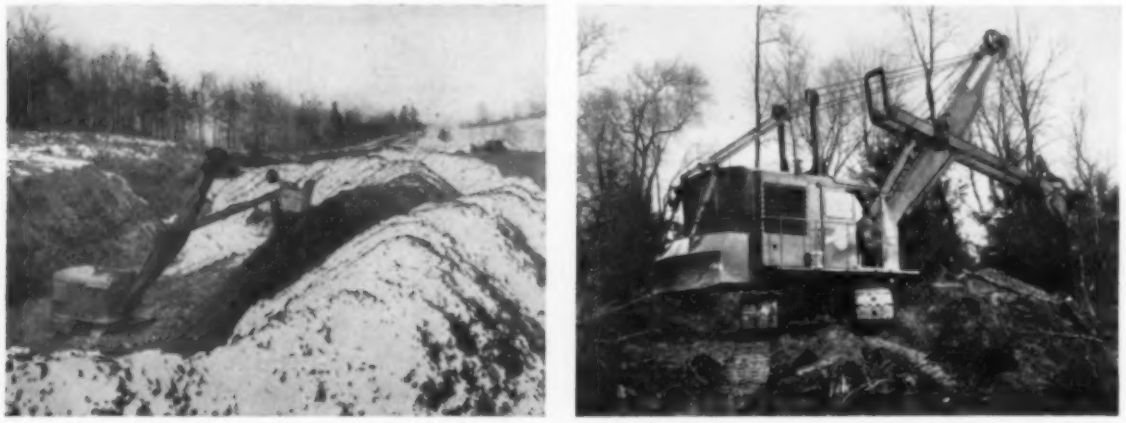
After the war, Mr. Stahlman returned to his trucking business, specializing in contract hauling of coal and heavy equipment. This proximity to coal mining led him to buy a small shovel to work some tracts on his own.

The Stahlman stripping enterprises grew until now the original trucking business is subsidiary to coal production. In April of this year, the W. P. Stahlman Coal Co. became a Pennsylvania corporation, ranking eight in tonnage produced by stripping in Pennsylvania's bituminous fields.

Mr. Stahlman's right-hand men are Dean Rhodes, who supervises the office, oversees coal sales and assists Mr. Stahlman in co-ordinating operations, and Clair Neiswonger, field foreman, who handles the immediate supervision in the field. Actually, all three men spend most of their time in the field to properly dovetail the activities of the numerous pits and co-ordinate haulage.

New evidence of further growth shows up in a recent announcement that a contract has been closed with Jeffrey Mfg. Co. to add to the company's coal-washing capacity by the addition of another jig to supplement a two-compartment unit already in service.

6-YD DRAGLINE strips overburden after drilling and blasting is done by contractor. This stripping unit is equipped with 120-ft boom, permitting efficient removal of 70-ft cover.



A 2-YD SHOVEL (left) removes hard material after bulldozer removes softer top material. The shovel in the right photo is opening up a new pit by cutting its way down to the coal. All heavy equipment is diesel powered.

the washing plant in separate bins according to seam of origin. This provides another way of adjusting the entire operation to demands for different products.

8. Field maintenance of the highest order is necessary because the equipment is working over such a wide area. In addition to the fuel wagon, which keeps all diesel-powered units serviced and supplied with lubricants, the company also provides welding service in the field from a generator truck. The Jeep also carries gas cylinders for oxyacetylene welding. The object is to insure fast repair service, no matter where the equipment is located.

Such methods make it possible to strip efficiently the scattered deposits.

RECOVERY METHODS

Most of the company's present production is recovered from the 32-in Lower Kittanning and the 36-in Clarion seams. One of the draglines has a 150-ft boom and one has a 120-ft boom, making it possible to work efficiently in overburden up to 70 ft in thickness. The longer reach of the draglines makes it unnecessary to rehandle spoil.

Stripping in thinner overburden usually is done by the 2-yd shovels, although the range of such a unit may be extended in localized thicker cover by assigning a bulldozer to move spoil away from the dumping point. The bulldozers also push soft material off the highwall into the pit. As a result, the shovels load faster and slides of the softer material are prevented. Four bulldozers are available, three International TD-24's and an Allis-Chalmers HD-20.

The coal-haulage fleet consists of nine Ford tandems with payload ratings of 16 tons each and one International K-11 rated at 11 tons. A Ford tractor, equipped with a revolving broom and a blade, cleans the top of the exposed seam.

The haulage roads are carefully maintained to eliminate wear-and-tear on the trucks and to permit running at maximum safe speeds. An Austin-Western and an Adams 55 motorized graders run a constant patrol of the roads to keep them shaped up. Rock for road-surfacing is produced in the normal course of

16-TON HAULERS dump coal from different pits into plant hoppers from which blends can be drawn for washing.

FLEXIBILITY THEME of Stahlman operations is carried out in this truck-mounted welder.

stripping and is hauled by the large dump trucks to where it is needed.

Pit drainage in the rainy seasons can be a problem in view of the number of pits in operation and the hilly nature of the terrain. To prevent run-off from interfering with the loading operation the company has a number of portable, gasoline-powered pumps which can be quickly moved to any place on the properties.

LAND RECLAMATION

Acquiring coal lands and mining rights to provide reserves for future mining is one of Mr. Stahlman's big responsibilities. Over the years he has purchased acreage outright. A second major source of coal is developed through a businesslike approach to farmers in the area. In these negotiations, Mr. Stahlman points out to landowners the full advantages of releasing their coal. Royalties are an important consideration, of course, but of even greater importance is the fact that the land will be returned ready for immediate agricultural use.

In many instances, the contours of fields after stripping and backfilling have been completed are better than before. And depending upon the original agreement between the parties, the fields sometimes have been returned to the farmers with crushed limestone applied.

Therefore, full reclamation is an integral part of the Stahlman mining cycle. On company-owned lands, the spoil peaks are bulldozed and pine trees are planted. Mr. Stahlman has a flourishing Christmas-tree program underway through yearly plantings of 100,000 trees and regulated harvest.

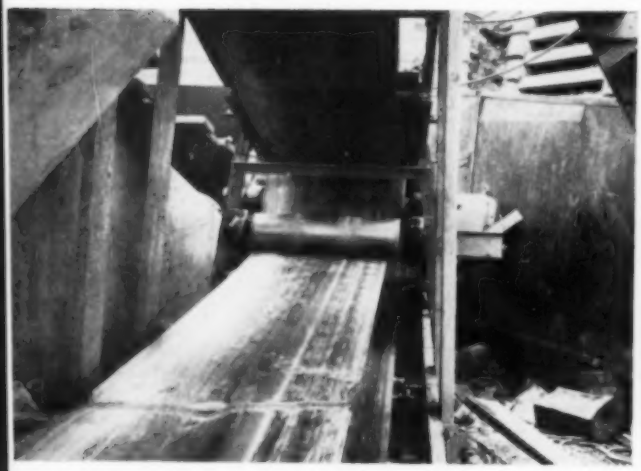
TOP OF EXPOSED SEAM is cleaned before loading by a power broom. Initial cleanup of heavy material is done by road grader.

LAND RECLAMATION includes backfilling to cover exposed coal, restoring contours or shaping spoil banks to permit Christmas-tree planting.

ROCK LOADER gathers well-blasted rock and delivers it to extensible belt. Cut is loaded in 45 min.

END of extensible belt receives rock from speedup belt. Speedup unit travels 450 fpm, main conveyor 400 fpm.

Rock Loader and Extensible Belt



EXTRA PULLEY at drive section holds belt down at end of takeup section near mouth of slope.

SPECIAL TAKEUP permits tail section to move back and forth 100 ft at face. Belt is added on surface.

ON THE WAY to the bin on the surface, well broken rock is centered on fire-resistant 36-in belt.

COUNTERWEIGHT under bin maintains tension on belt takeup through 5-rope pulley arrangement.

PULLED BACK from face, loader and tail section are in safe position during blasting. Belt has special 100-ft takeup.

SELF PROPELLED tail section of extensible belt is maneuvered behind loader to receive broken rock.

Sink New Ireland-Mine Slope

By A. E. FLOWERS
Associate Editor, Coal Age

FASTER SLOPE DEVELOPMENT is being achieved with a new equipment team at Hanna Coal's new Ireland mine at Cresap, W. Va. Coupling a 36-in extensible belt conveyor and crawler-mounted rock loader, Hanna had marked up at the time this article was prepared a total footage of 84.0 ft in the week ended Oct. 5 (15 shifts). Rates per single shift ranged from 4 to 10 ft. Slope size is 9x18 ft before lining. Inclination is 15 deg.

Hanna adopted the modern mechanized method to conserve manpower and virtually eliminate pick and shovel work. A four-man crew supervised by a foreman performs all the duties of drilling, blasting, roof-bolting, loading and disposing of rock on the surface.

The extensible belt is a Joy 36-in unit with a special 100-ft takeup that permits the tail section to be trammed a safe distance away from the face during blasting. Hanna relies on a Joy 18HR rock loader to pick up the blasted rock and discharge it onto the tail section of the extensible belt.

Hanna management cites the following reasons why the belt-loader method is proving so successful:

1. Broken rock does not accumulate along the ribs as it does when a slusher is used to load the rock. The loader can work better along the ribs.

2. There are no sheaves to change or pins to be placed. Therefore, the delays and expense resulting from sheaves breaking and pins pulling out are eliminated.

3. The bottom of the opening can easily be maintained at the proper grade with the 18HR loader whereas a slusher usually digs out broken rock that may be below grade. By keeping the floor nearly on grade as the slope is driven, the company saves the expense of filling and grading in the future when the supply track will be laid.

4. The problem of locating sheaves properly to get good loading with a slusher is eliminated.

5. Hand labor required with slusher loading is eliminated.

6. No track is required with the belt-loader setup.

7. Rate of loading is much faster with the 18HR than with a slusher. A cut of rock is loaded in 45 min.

8. Four men do the same work that seven men do when a slusher is employed.

HOW THE CREW WORKS

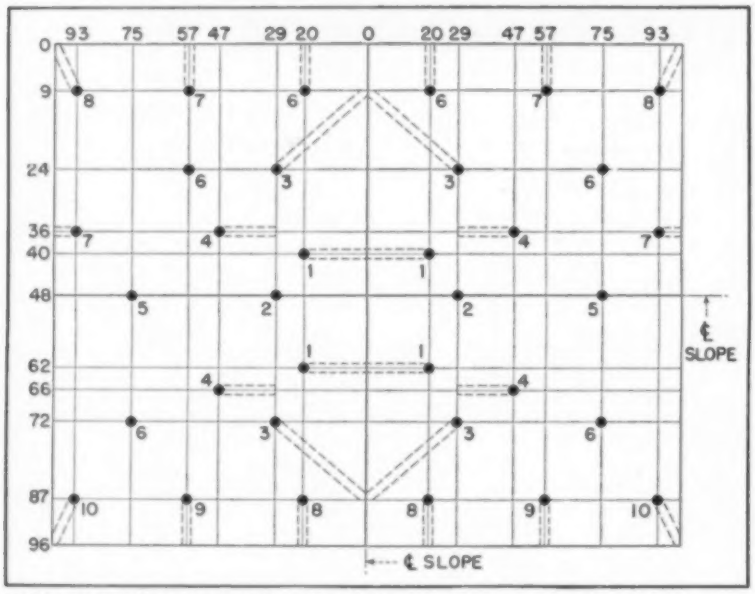
To keep the slope work running smoothly with a minimum of delays, Hanna keeps face activities on a definite cycle. Here is how the system works:

At the beginning of the shift, the oncoming crew continues where the previous shift stopped. For example, if the oncoming men find that the blasted rock is loaded, they start drilling. Three men use Joy SAL

SUPPLY SLOPE at Hanna's new Ireland mine is being advanced at top speed with extensible belt and crawler-mounted rock loader.

DRILLING follows definite pattern. Teamwork among crew speeds fact operations. Crew drills 40 to 45 holes in face and installs 20 bolts in shift.

ROOF BOLTING is done while face is drilled. Bolts are 6-ft wedge-type units.



DRILLING AND BLASTING DIAGRAM shows hole spacing in rock face of slope and sequence of blasting at Hanna's new Ireland mine.

Record Shift to Date

Bolts set	21
Holes drilled	46
Holes shot	54
Feet loaded	10
Stocks explosives	346
Detonators	54
Bits used	4
Drill steel replaced	1

stopers with telescopic legs to drill holes for roof bolts. The fourth man starts drilling holes in the face. A Gardner-Denver 500 air compressor driven by a Caterpillar D1300 diesel engine provides compressed air for the drills. Mounted on the surface, the unit supplies air at 100 psi. After completing his share of the roof drilling, one of the roof men switches to face drilling. Shortly afterward, another also switches to face drilling. Each man drills specific holes in the face pattern. When the fourth member of the crew completes the roof-bolting, he goes to the surface for powder, caps and stemming. Joy L-47 rock drills, Acme drill steel and Cleveland tapered-steel throwaway drill bits are used for drilling. Chicago Pneumatic 610 impact wrenches are used to tighten the bolts. All drilling is done wet.

Water inflow during development is handled by 5x5 Deming Oil-Rite pumps. A REDA submergible pump will be installed in the slope sump when the development is completed.

When the first member of the crew completes his face holes, he carries drills and air and water hoses back from the face. By the time he has removed his equipment and that used by the man who went for blasting materials, the two remaining drillers have completed their drilling. All the men then go for tamping materials and prepare to blast. It takes about 2½ hr to install roof bolts, drill and load the face blastholes.

Holes are charged with 1½x8-in cartridges of Liberty 40% gelatin and detonated with MS delays. The crew withdraws to the surface and the round is detonated with a permissible 220-v blasting switch. It takes about 20 min for smoke to be swept away by the ventilating current. The men then return to load the blasted material.

During the loading part of the cycle one man operates the 18HR loader, and another runs the self-propelled tail section of the extensible belt and keeps it in position behind the loader. An underground utility man adds air or water lines, operates a Brown-Fayro hoist to help pull the loader back from the face, and changes drill bits. The fourth man stays on the surface and operates a 1½-ton truck to haul rock from the steel storage bin to the disposal area.

As the face is advanced, the crew also extends a temporary brattice to maintain good air circulation in the work area. The temporary material is later replaced with corrugated sheet steel by the outside construction crew, which is more skilled in that type of work. Thus the face cycle also is not interrupted.

To keep face equipment in top operating condition, a rigid system of inspection and preventive maintenance is carried out. All drills are dismantled every two days, regardless of whether they are performing perfectly or not. Parts that show signs of wear are replaced. This is done to keep them in top condition so drilling can be done at maximum speed, and to prevent breakdowns. Line oilers are installed in the compressed air lines and are filled twice daily to assure proper lubrication of drills throughout the shift.

EXTENSIBLE BELT SELECTED

A special feature of the extensible belt is the takeup that permits the tail section to be extended or retracted a distance of 100 ft. This is twice the distance that a conventional unit can be extended without adding a section of belt. The additional takeup distance was needed so that the tail section can be withdrawn sufficiently far from the face to prevent damage by flying rock.

The development of the 100-ft takeup is another example of the result of cooperative efforts of Hanna management and equipment manufacturer. A spirit of cooperation between Hanna's engineering, operating and maintenance departments has produced many improvements in equipment and techniques in the past. In addition, Hanna has called on various manufacturers to develop or design special equipment to fit a particular need.

When the new Ireland mine was in the planning stage, the question of what equipment to use to sink the slope came up. George McCaa, general manager of Hanna's West Virginia development, suggested a combination of crawler-mounted rock loader and extensible belt for the job. However, a conventional extensible unit could hold only 50 ft of belt in the takeup cluster in the drive. This meant that the tail section could be pulled back only 50 ft from the loading area during blasting.

To solve the takeup problem, Mr. McCaa suggested that a new 100-ft takeup be designed and that it be located on the surface so the belt could be added easily. The idea was passed on to engineers of the Joy Mfg. Co., who then designed the unit to meet Hanna's needs.

BELT COMPONENTS

The drive for the 36-in extensible belt is a Joy MTB unit with slight modifications to fit the slope installation. These changes included installing a 12-in pulley ahead of the drive pulley to bring the belt to the horizontal position at the beginning of the takeup. The belt is powered by a 60-hp 440-v motor transmitting power through a hydraulic coupling. Protection against belt slippage is provided by a rotary switch. A mechanical brake prevents backward travel of the belt.

The takeup section extends horizontally from the drive at the portal of the slope a distance of 108 ft. Three 16-in pulleys mounted on 4-in wheels are free to travel back and forth in channels made up of standard intermediate sections. Tension on the takeup is maintained by a 16,960-lb weight acting through a 5-rope pulley arrangement. An extra pulley was added on the return side of the takeup where the belt changes from horizontal to downhill travel at the mouth of the slope.

The portion of the belt framework extending from the drive section at the portal to the discharge end over the rock bin and the takeup are made up of standard intermediate sections. These will be recovered and used underground when the slope is completed. From the belt drive to the self-propelled tail section, the conveyor is made up of Joy extensible sections with Limberollers.

To provide better operation of the tail section, a heavier hydraulic motor was installed. The tail unit also is equipped with a diversion valve that permits the crawlers or belt conveyor on the tailpiece to be operated separately. This feature was included because of the heavy wet material that is being handled. Capable of swinging 15 deg either side of the belt center, the tail section is powered by a 15-hp motor. The end section may be started or stopped independently of the main conveyor. Traveling at a speed of 450 fpm, the belt on the tail section acts as a speedup unit and smooths the transfer to the main belt, which operates at 400 fpm.

The face crew installs the lightweight intermediate sections, Limberoller troughing idlers and return idlers. Belt is added on the surface by the day-shift maintenance crew so that the underground men can concentrate their efforts on advancing the face. A Michigan tractor shovel is used to carry 100-ft rolls of Goodyear neoprene belt to the takeup section where it is spliced in while the underground is not loading rock. Sections of belt are joined with Hayden splices.

Work on this Ireland supply slope started May 15, 1956. A shovel and bulldozer made the initial cut in the hillside. Before any work was begun on the slope opening, a concrete collar was poured at the portal site. The slope then was driven 42 ft and stopped because of mud slips in the rock strata. An additional 37 ft of concrete lining then was poured before slope driving was started again.

During the period when the concreting was being done, the outdoor portion of the belt, drive and takeup were installed on the surface. When the concrete work was completed, slope driving was started in the manner in which it is being done today.

When the supply slope is completed, the extensible belt will be used underground in entry development. The finished dimensions of the slope will be 7x16 ft. A 1-ft lining of concrete in the 9x18-ft portion of the slope will reduce the area to the final size. In solid rock, wire mesh will be placed on the roof and ribs and then coated with a sand-cement mixture sprayed on with a Jetcreter.

RETURNING to surface after checking underground progress are Stanley Obejenski (left), mine foreman and John Zitko, superintendent.

The Hanna Management Team

President	James Hyslop
Vice President	James D. Reilly
Chief Engineer	Andrew Hyslop, Jr.
Safety Manager	Ewalt E. Herzog
General Manager, W. Va. Development	George McCaa
Chief Engineer W. Va. Development	Lionel Sarff
Superintendent, Ireland mine	John Zitko
Maintenance Foreman, Ireland mine	Eldred McCartney
Mine Foreman, Ireland mine	Stanley Obejenski

1 **BANK MATERIAL,** containing from 7% to 12% marketable coal, is excavated by dragline and loaded into belt-conveyor feed hopper. The bank is an accumulation of material built up over 75 yr.

2 **LARGE PIECES OF SLATE,** bone and wood are picked out of belt line at feeder control station.

Low-Cost Bank Reclamation

Fully-conveyorized, in-line materials handling, from culm bank to final refuse bank, permits Black Star Anthracite Co. to handle 160 tph of raw material to recover a yield in clean coal of about 10%.

SIMPLIFICATION OF MATERIALS-HANDLING is the outstanding feature of bank-reclamation methods employed by Black Star Anthracite Co., Hazleton, Pa. The plant is a 2,250-ton-per day heavy-media installation, operated on a two-shift basis by only seven men per shift, or an average of 160 tons of feed per man day. This low manpower requirement is due primarily to the use of a 1,050-ft-long belt conveyor instead of trucks to transport the raw bank material to the cleaning equipment.

Total recovery in coal is from 7 to 12% of the input to the plant. Handling high tonnage to get a relatively low yield demands that both investment and operating charges be held to a minimum. Total cost of the plant is approximately $177,500. Operating costs are low because of the following:

1. A comparative study of trucks vs. belt conveyors for transporting the raw bank material show that over the distances to be encountered belt transport is much cheaper. Early experience shows that the cost per ton on the belt is about 80% below the most reasonable contract trucking rate.

2. Power costs are down because of new modern equipment, including screening of the raw material on the latest model "resonant-spring" screen, the Hewitt Robins hi-G, and clean coal is distributed over the tops of the storage bins and reclaimed at the bottom of the bins on vibrating feeders which require a minimum of power.

3. The heavy-media vessel (Wilmot OCC) has only one moving part, the sink-removal rake, thus keeping maintenance costs at a minimum, and mag-

The Background . . .

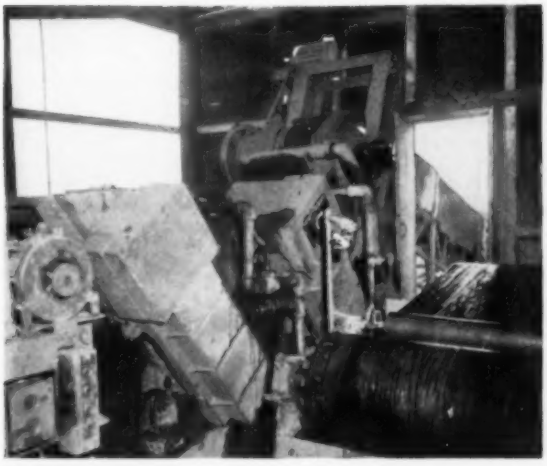
THIS ARTICLE is a description of a streamlined anthracite coal bank-reclamation project initiated by Dennis K. Pickens, New York, a mining engineer who has operated bituminous coal-mining properties in Pennsylvania, West Virginia and Illinois. His present enterprise, Black Star Anthracite Co., is organized to extract marketable anthracite from nearly 5,000,000 tons of culm banks which have accumulated over the past 75 yr at Lehigh Valley Coal Co. Hazleton shaft. Coal Age editors have visited Mr. Pickens' operations before. An article in the March, 1950, issue describes the stripping and cleaning methods of Joliana mine in southern Illinois, in which Mr. Pickens was principal owner and resident manager of operations. This property featured the first Illinois installation of heavy-media cleaning.

Other supervisors and officials at Black Star are: Russel Patrick, general manager; John Summers, superintendent; and Harold Lindsey, plant foreman, all veterans in coal mining and coal preparation.

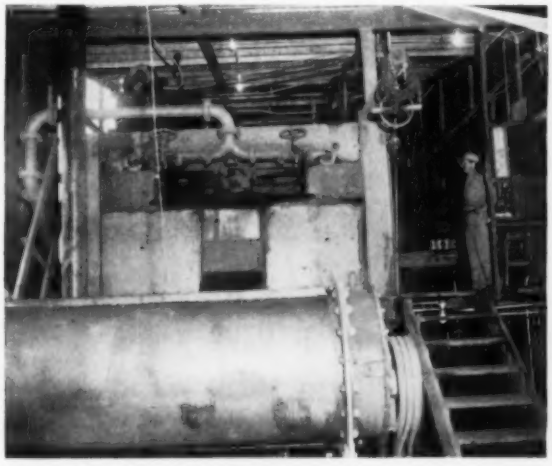
At this writing, the Black Star group has another reclamation plant, designed to handle 5,000 tons of culm bank material per two-shift day nearing completion near Mahanoy City, Pa. This new facility is expected to handle and clean nearly 300 tons of feed per man day.

3 **1050-FT BELT CONVEYOR,** supported on ties on a graded ramp, transports bank material to plant.

4 **MINUS 3-IN MATERIAL** by-passes crusher, plus 3-in is crushed, and both streams are combined on plant-feed belt conveyor. A new refuse conveyor is under construction to extract valueless oversize at this point.



5 **FEED BELT** discharges to new type "resonant-spring" vibrating screen which removes minus 3/16-in fines.



6 **HEAVY-MEDIA VESSEL** separates coal and refuse at 1.77 sp gr. Magnetite loss is about ¼ lb per ton of feed.

netite consumption is low (¼ lb per ton of feed).

4. Stainless-steel punched plate is used for screen surfaces to provide longer life and lower labor costs for replacement. Pump impellers are made of stainless or other special alloys for the same reasons.

5. A central electrical system permitting one skilled operator to control the entire operation – conveyors, crushers, screens and coal cleaning.

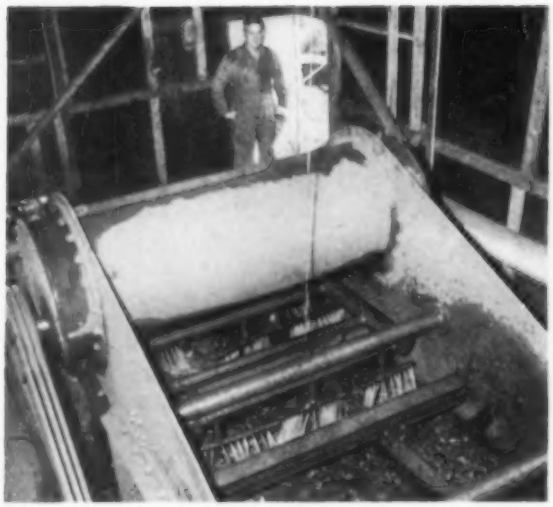
STRAIGHT-LINE MATERIALS HANDLING

Following is a description of the Black Star circuits. The numbers in parentheses refer to the numbered illustrations on these four pages.

The bank material is excavated by a Bucyrus-Erie 54-B dragline which discharges into a 50-ton hopper (1). A Hewitt-Robins vibrating feeder underneath the hopper (2) feeds raw material onto the 24-in belt conveyor at about 160 tph. The duties of the attendant at this point include hand-picking of large lumps of rock, pieces of wood and tramp iron, and controlling the feeder.

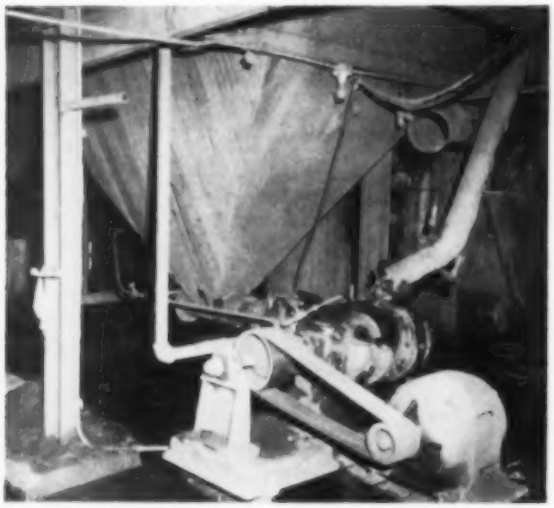
The 1,050-ft Hewitt-Robins conveyor (3) is installed on a graded ramp with the conveyor structure supported on reclaimed railroad ties. The conveyor discharges into a 50-ton surge hopper (4) near the heavy-media plant. A variable-speed elevating apron conveyor raises the raw bank material to a scalping screen which makes a separation at 3 in. The minus 3-in material is chuted directly onto the 24-in plant-feed belt conveyor and the plus 3-in is passed through a crusher to reduce this oversize to minus 3 in. The crusher product is also discharged onto the feed belt. A Merrick Weighometer on this conveyor records the weight of the ingoing feed.

The plant-feed conveyor discharges at the top of the cleaning circuit in the plant onto the double-deck hi-G vibrating screen (5) which discharges plus 1-in material from the top deck and plus $^{3}/_{16}$-in from the botton deck. The minus $^{3}/_{16}$-in underproduct of the screen is piped by gravity to a disposal area. Overproducts of the two screening decks are combined to feed

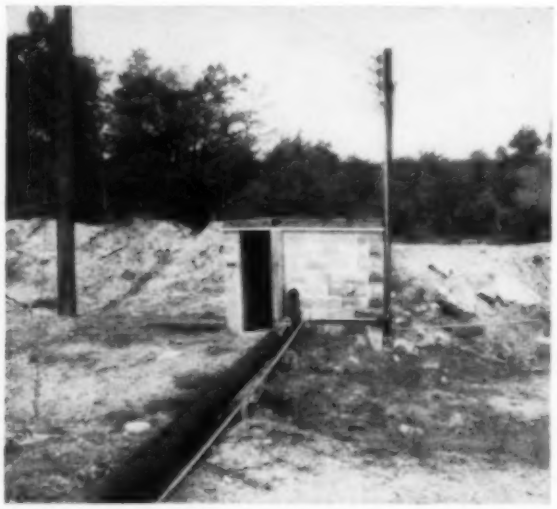


7 **DRAIN-AND-RINSE SCREEN** is first step in magnetite reclamation. Harold Lindsey (above) is plant foreman.

8 **REFUSE IS DISCHARGED** outside plant. A new refuse conveyor will extend farther to eliminate bulldozing.



11 **TWO MEDIA SUMPS,** under drain-and-rinse screen, provide for direct return and for magnetic recovery.



12 **WATER SUPPLY** is pumped from impounding dam through 8-in pipeline to plant. Deepwell is a standby.

the illustrated heavy media vessel.

The refuse, which is 90% of the feed, drops to the bottom of the vessel to be lifted out of the bath by an oscillating rake and discharged at the sides of the vessel. Clean coal flows across the surface of the bath and over the discharge weir. Both coal and refuse are chuted onto a partitioned Eliptex vibrating screen (7) to remove free-draining medium near the feed end of the screen and to permit washing of the remaining medium on the discharge half of the screen.

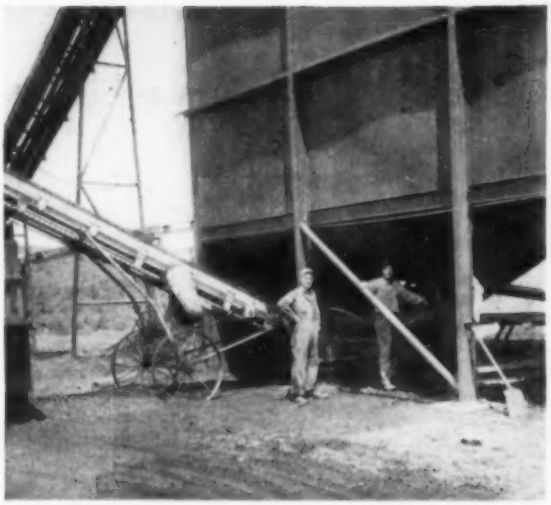
Drained and washed refuse is lowered in a chute and placed on a third belt conveyor (8) to be discharged in the waste area outside the plant.

Clean coal from the drain-and-rinse screen is fed onto a belt conveyor to be elevated to the distributing conveyor (9) along the tops of the clean-coal storage bins. The clean-coal conveyor discharges into a double-roll crusher set to produce a minus 1⅝-in product, or nut and smaller. The distributing conveyor, a vibrating unit driven by a 1-hp motor, doubles as a final-sizing screen through which the Rice, Buckwheat, Pea and Nut sizes are dropped into separate 85-ton storage bins. A fifth bin adjacent to the crusher, holds unsized clean coal and may be used to store clean coal in the event the distributing conveyor breaks down.

A similar vibrating conveyor (10), underneath the storage bins, is used to rescreen and water wash the clean coal and transport it to a truck-loading portable conveyor. It is less costly and easier to provide this low-power conveyor than to move the portable unit from bin to bin with each order for coal, or to have five conveyors.

The medium-reclamation system consists of a pair of sumps, one to receive the fast-draining medium which is pumped back to the vessel directly, and the other to receive the rinsings from the drain and rinse screen. Magnetite solution from this second sump (11) is passed through a magnetic separator, where the magnetite is re-

9 **CLEAN COAL** is sized and distributed to storage bins on 40-ft-long vibrating conveyor with a 35-tph capacity.



10 **SIZED COAL** is reclaimed from bottoms of bins on second vibrating conveyor to feed portable unit.

JOHN SUMMERS (left), is superintendent, and Frank Leonard is office manager at Black Star. Joseph Slavick, coal salesman, promotes the company's product as he goes about his sales missions in this eye-catching company car.

covered and concentrated and returned to the first sump.

Water supply was a problem in the earliest days of plant operation, but this was solved by building a dam (2) to impound surface drainage and pumping from an existing deepwell. Process water now is pumped 1,000 ft from the dam to the plant, assuring an adequate supply. An auxiliary 2,700-ft line to a small creek has been installed to assure adequate water.

MODIFICATIONS TO INCREASE EFFICIENCY

Plant changes are underway now to further streamline the Black Star materials-handling system. To the left of the conveyor in Photo No. 4 a new refuse conveyor is under construction alongside the raw-feed scalping and crushing equipment. This conveyor, also a belt unit, will extend from the scalping screen to a point beyond the present refuse area to provide ample waste space for years to come. The conveyor will pick up all oversize from the scalping screen, then pass through the plant to pick up refuse from the heavy-media vessel. Extra length at the discharge end will eliminate the need for a bulldozer which now pushes piled-up refuse, as shown in Photo No. 8 and will enable the system to handle about 3,000 tons per two-shift day in the near future.

With this system in operation, it becomes possible to sustitute a much smaller crusher in the raw-material circuit.

The seven men employed at the plant have the following duties: A dragline operator and an oiler, an attendant at the dragline hopper, an operator at the scalping and crushing station, an operator on the heavy-media floor, an operator for the clean-coal conveyor, crusher and distributor, who also removes wood chips from the final product, and a truck-loading attendant who operates the vibrating and portable conveyors under the clean-coal storage bins.

MODERN ROOF BOLTING EQUIPMENT, operated by one man, provides effective roof support for mining units.

RIGID MAST, set solidly against floor and roof, supports drill drive motor during drilling and tightening operations.

Safer Roof Support at Lower Cost

Evaluating drills and bits to find the ones most suited to their conditions and training operators, through their supervisors, to use this equipment properly leads to better roof bolting at Crucible.

BETTER ROOF BOLTING in a conventional-mining cycle is a direct result of applying the latest equipment to the job at Crucible (Pa.) mine of the Crucible Steel Co. of America. Safety is served since the bolting is done as soon as possible after a cut of coal is loaded, and economy results because the equipment is designed to permit the roof bolting to be done by one man.

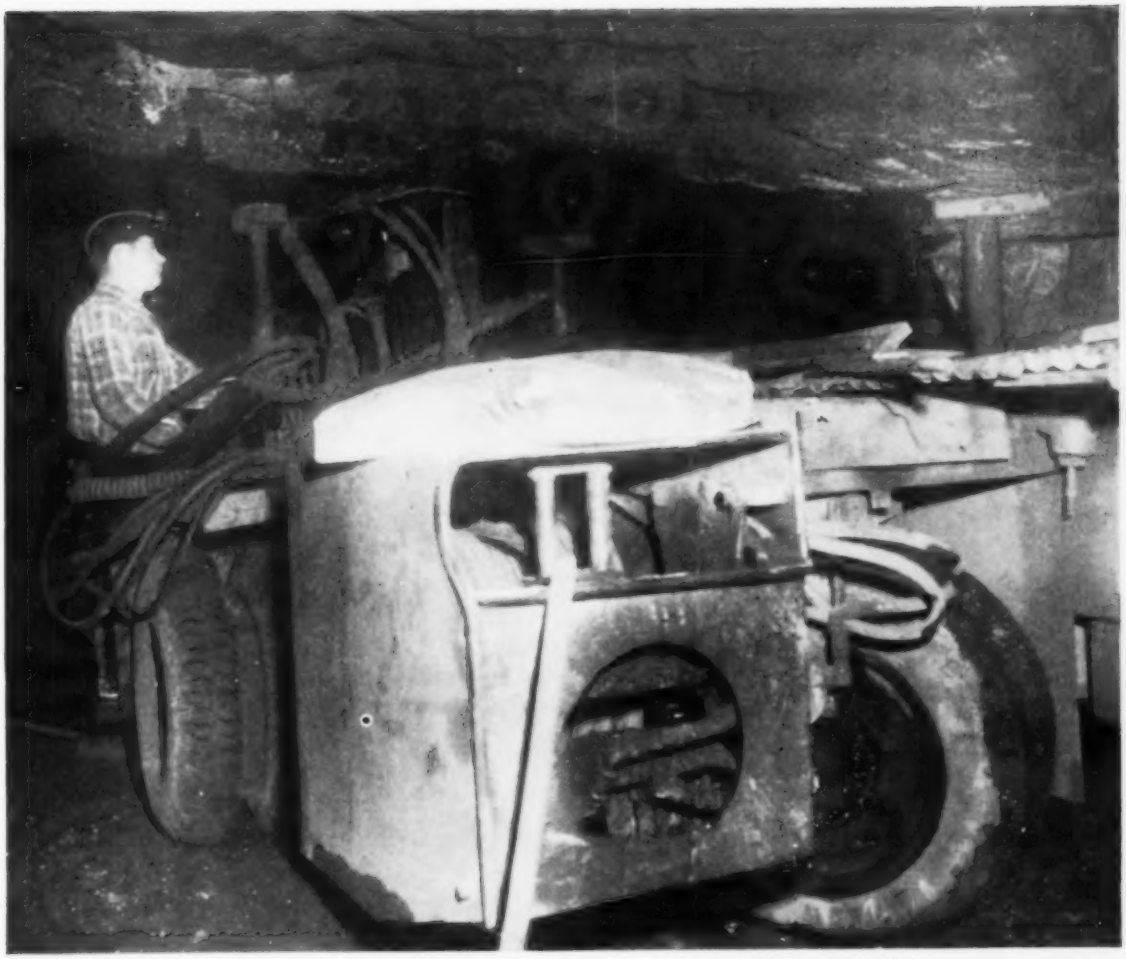
Two of the nine Crucible mining units (all 100% bolting at the face) are equipped with Fletcher Type DAF drills. These units are self-propelled on three wheels, all wheels driving. The third wheel, at the rear, is dual-tired. The combination of a dual-tired steering wheel and power on all wheels reduces skidding on soft, wet bottom. Furthermore, the drill is equipped with a cable reel holding 500 ft of cable, making it unnecessary to assign a man to handle the cable.

Crucible officials, in their efforts to refine their bolting system, have conducted lengthy experiments with bolting patterns and have carried on a program of evaluating bits, bolts, bearing plates and so on. Such studies have gone so far as to include an evaluation of the merits of buying pre-drilled header boards vs. drilling the boards on the property. It was found to be more economical to have the vendor predrill the boards.

Operations are in the Pittsburgh seam, including 90 in of coal and from 10 to 12 in of drawslate which is loaded with the coal in some sections. Entries and rooms are driven 14 ft wide and pillar pockets are 18 ft wide.

Three rows of 5-ft x ¾-in expansion-shell bolts are used in the narrower openings and four rows in the pillar places. In the three-row system, one row is installed along the centerline with side rows 4 ft from the centerline each way. Bolts in the rows also are 4 ft apart. In the wider pillar pockets the fourth row is installed as close as possible to the fender to provide full protection for the loading machine operator as he recovers the fender.

Equipment used by the 10- or 11-man face crews includes Goodman 665B loading machines or Lee-Norse rubber-tired conversions of Goodman 460's, Joy 10RU on Lee-Norse conversions of Sullivan 7AU cutting machines, Joy 10SC or Goodman 571 shuttle cars (two per section), Jeffrey A-7 hand-held electric drills and the roof-bolting equipment. The shuttle cars discharge into 8-ton Differential Steel mine cars. Where drawslate cannot be held up, face preparation consists of shearing both ribs and making a top cut under the drawslate to prevent spalling and overhanging ribs. However, only a single shear is used in places where drawslate is held. Coal is broken with Monobel AA.



DRILLING MACHINE is equipped with cable reel to eliminate cable handling, powered dual steering wheel at rear for skid-free operation on wet floor, built-in dust collector and speed and pressure controls on drill drive.

As mentioned, the bolting machine is trammed into the place as soon as possible after a cut is loaded out. Steel safety jacks used at the face by the loading crew are left in place to provide maximum safety for the bolter. In a normal shift the bolter will install from 45 to 48 bolts. This includes the assembly of bolts, using Ohio Brass expansion shells and 6x6-in steel bearing plates.

Roof conditions are variable. Immediate roof in some areas is soft and this material fell away from around the bolts in experiments where only the 6x6-in plates were used. Under these conditions, 1½x9-in by 12-ft planks are bolted against the roof to stabilize this material. The planks are predrilled, but the holes sometimes are disregarded if they are not in the exact position where a bolt should be placed. In such instances, the drill first penetrates the plank, then proceeds to drill directly into the roof.

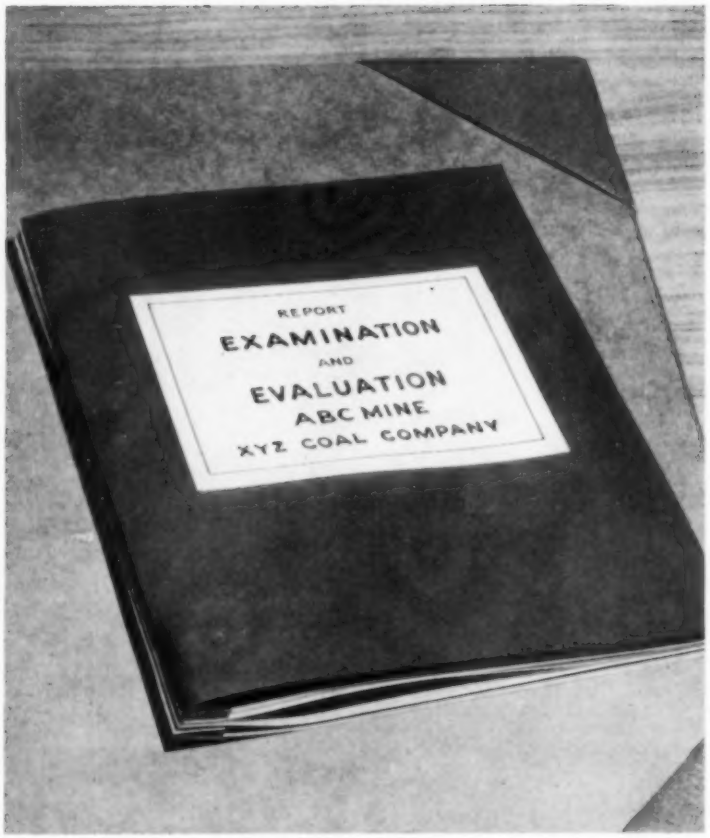
The plank is held in position against the roof by the rigid mast of the drill which forms a solid column from the mine bottom to the roof. The drill is raised and lowered on this column. In other places, where the roof is less crumbly, the main bearing surface under each bolt consists of a 3x8x18-in block predrilled with a 1⅝-in hole and supported by the 6x6-in steel plate. In still other places the steel plate alone provides sufficient bearing area.

In most areas a hard sandstone is encountered above the softer material and this poses a drilling problem. The speed of rotation of the drill must be immediately reduced when the hard rock is encountered by the bit. This is a matter requiring close supervision and good operator training, C. B. Tillson, Jr., Crucible's general superintendent, says. Trying to drill the hard rock at high speed materially reduces bit life. However, rotation-speed and drilling-pressure controls are provided on the drill, thus well-trained operators can make a difference.

Roof-drilling bits are Vascoloy-Ramet Type DR and Kennametal Type FDH in diameters of 1⅜ and 1½ in. The larger bits are used as starters. Drill operators are trained to change dull bits immediately to prevent loss of gage. This program of evaluating bits to find the best ones for the conditions and training operators to use them properly is aimed at getting longer bit life, thus lower costs.

The Fletcher roof drill is equipped with a 12-ft 6-in Hydroslide attachment to permit a row of holes to be drilled from a single set up. The rigid mast can be tilted to facilitate tramming in low places, and the machine includes an integral Mine Safety Appliances Co. dust collector to safeguard the health of the operator.

Rating Your Mine For Efficiency Cost and Safety



HOW WOULD A PROSPECTIVE BUYER rate your mine if it was up for sale? Or, taking the opposite tack, what would you be looking for if you were buying? But perhaps you are among the majority that are neither buying nor selling. Should you still be interested in what sellers look for and buyers should provide? The answer is "Yes," because the mine that would be attractive to a purchaser is a mine that should be returning a good income to its present owner.

You can find out how your mine would look to a buyer, and at the same time check on how you are doing from the efficiency, cost and safety standpoints. To facilitate such investigation, *Coal Age* offers the following 20 check points.

1 **Maps are important.** A prospective buyer, visiting your mine, would ask to see (1) an up-to-date mine map with dates of mining posted in all areas, (2) an accurate property map, including certification of ownership and verified surface, mining and haulage rights, (3) a good topographical map, preferably at a scale of 1:200 and (4) a record of seam elevations, either on the mine map or in other records. These documents are a necessary first step for any prospective buyer. He cannot proceed until after he closely examines them.

Since accurate maps are so important to a buyer or his appraisers, they should be equally important to the operator who plans to continue at his own mine. Up-to-date maps are absolutely necessary if "blind flying" is to be avoided by a mine operator.

2 **Records of coal analyses** and seam sections will be asked for, especially if a prospective buyer has a market in which sulphur and ash may be overriding factors. He will certainly want to construct iso-sulphur lines to help him schedule the mining of successive areas to better advantage. He may also want to see a map in which the property is divided into areas according to seam thickness, because he would want to know whether all reserves are in thinner coal.

Information like this could be mighty helpful to you also in projecting your future mining plans and sales activities, even if your mine is not up for sale.

3 **A complete diagram** of your ventilating system must be spread before your visitor. It should show the locations of all fans, airshafts, escapeways and so on, and should indicate the condition of stoppings and old aircourses. The buyer of course would be interested in estimating from this diagram the cost of improvements that might have to be made.

You could use a map like this to similar advantage. It could show you where you should invest money and labor to achieve maximum improvement in ventilation. If you don't already have such a map, why not have one made?

4 **An electrical map,** a drainage diagram and a pumping record are other important documents a buyer's man will ask for.

These are engineering aids you should have for your own guidance in planning expansion into new areas, in introducing additional equipment and in heading off water troubles or figuring on drainage improvements. An electrical map should show the locations, types and sizes of substations, circuit breakers and both positive and negative conductors. A drainage diagram should include the locations, types and sizes of all pumps and pipelines. An operating record for all permanent pumps should show how much water is pumped, when it is pumped and changes in pumping requirements with changes in rainfall.

[At this point, the buyer or his engineers will want to go underground to observe conditions for themselves. Here are some of the points that will draw their particular interest.]

5 **Vertical and horizontal clearances** and curve radii will be carefully checked with the thought that some day new and larger mining machines may be brought into the mine.

This is something you should check before ordering new equipment. You will want to know in advance whether the equipment must be dismantled before it can be taken inside.

6 **The immediate roof** will be closely checked for slips, cutters, kettlebottoms and so on by the visitors. They will want to know what they have to contend with in the event a deal is made.

Roof-inspection should be a habit with you. Knowing the particular characteristics of the roof in your own mine, designing minimum roof-support standards to meet these peculiarities and following through on enforcement of these standards will lead to higher efficiency and greater safety.

In fact, close study of your roof might indicate that you should alter your present mining plan somewhat to gain operating and safety advantages. For more on this important subject turn to the article entitled "Holding Top at the Face," beginning on p 58 in this issue of *Coal Age*.

7 **Supply routes** and supply-handling procedures will be studied to determine whether or not they are adequate now and whether they can be beefed up to serve future expansion, if such is contemplated.

Your supply routes and handling methods should be a matter of constant study. Top-level production depends upon efficient supply handling.

8 **Your track system** will be checked for alignment and grading. The capacity of the system will be an important consideration, and this brings up such matters as weight of the iron, spacing and size of ties and condition of ballast. Condition of rail bonds also will be looked into. If the system is badly deteriorated, the cost of repairs may deter a buyer.

If you're not selling the property, good track maintenance is even more important because you have to live with the system.

9 **In off-track working sections** your visitors will take a long look at the condition of the bottom. They will look for evidence of heaving and will rate the roadability of the bottom material. It is important to know whether corduroying will be required.

Could you possibly solve the problem of heaving by slightly increasing the center distances of openings? Are you tolerating sloppy road conditions that can be eliminated through a modest expenditure? Increased production may more than pay the expenses involved.

10 **A detailed inventory,** listing every item of equipment at the mine, must be prepared for a prospective purchaser. He will also want to know its age and condition. It is from this list that he will estimate the present value of the mechanical equipment.

Sad but true, some mine owners do not know exactly what they do own in equipment. Every mine owner should have an up-to-date detailed equipment list, if only for the assistance such records provide in achieving better maintenance.

11 **Your maintenance setup,** including records, shops and personnel will be of more than ordinary interest.

Inadequate and inefficient maintenance exacts a double or triple penalty today in view of the high cost of equipment and labor. Even if you aren't selling, here is a prime target in the drive for minimum cost.

12 **A coal-mine buyer** who knows what he is doing will check your safety record very closely.

A good safety record is one of the best of all indications of an efficient, low-cost operation. Also, it means real savings in direct compensation cost and in indirect costs for damage and delays. Whatever your position on selling, safety must always be your primary concern.

13 **At the face** your visitors will be certain to check voltage at your machines. Low voltage may be a sign that major revamping of the power distribution system is needed.

You should make a similar inspection. Even if you intend to work out the property yourself, you might better know the facts about your power needs now.

14 **The quality and competence** of face supervisors and the skill of equipment operators and other workmen will be closely evaluated. A prospective buyer would thus determine what training programs he might have to provide.

Traced back to their source, lack of skills in workmen and poor supervision reflect unfavorably on a mine owner. Top-level workmen and supervisors cannot always be hired. Sometimes they must be developed locally through well-planned training efforts.

15 **Sometimes a prospect** views an existing mine with ideas of expanding or modernizing the property. In that event, he would look for as many opportunities as possible to salvage equipment and materials to reduce the investment that would otherwise be necessary to modernize or expand.

The salvage value of old equipment and useless materials at your mine may be enough to permit you to invest in a new machine that will improve overall efficiency. Don't overlook this possibility.

16 **If expansion of the mine** is a possibility in the buyer's mind, he will study the property to determine whether there is sufficient room for refuse disposal, sufficient space for car storage and ample water for washing coal. He will also take steps to head off any stream-pollution difficulties that might result from increased refuse disposal and expanded preparation.

Studies like these should precede any expansion you may plan for your own account.

17 **In every instance,** a man seeking to take over a going property will look for sources of added revenue on that property. Settling ponds and refuse banks will be tested to see if they contain recoverable coal.

New cleaning equipment and materials-handling techniques may make it possible for you to rework ponds and banks at your mine. Knowing how much coal is in such deposits is the first step.

18 **Coal storage facilities** at the mine—raw, prepared or both—are being increasingly installed because of their stabilizing influence on both production cost and marketing. Your buyer quite likely will check on what you have, or if none, on the possibilities of creating such facilities after he takes over.

Do you have storage facilities or a place where they can be added? The trend in the industry indicates that they are becoming increasingly important.

19 **A thrifty purchaser** will go so far as to study the history of precipitation in your area. Periods of high rainfall will be noted, and wintertime conditions will be of particular interest. Such information indicates to him the troubles that might be expected from excess water in certain periods and he will be forewarned of traveling difficulties during the winter.

Keeping records of weather conditions is worthwhile since they may help to eliminate idle days resulting from bad weather. Memory sometimes fails in matters like this.

20 **Opportunities for draining** active workings to lower old workings wil be closely assessed. This is particularly important where active places go to the dip.

Compare the costs of drilling small-diameter holes down to lower openings or to the outcrop against the cost of providing, moving and maintaining pumps and lines back through the active mine. The boreholes may have a decided cost advantage.

How to Get Results From Your Mine-Rating Survey

THE FOREGOING 20 CHECK POINTS are some of the matters a prospective buyer of your mine would seriously weigh. Any one of them may critically influence his decision. All this information would be carefully recorded, and the resulting report would be used as the basis of a program of action as follows:

1. Determine what is available. The maps, the list of equipment, the estimate of reserves and other such records would show in detail what the new owner would have to work with.

2. Define operating plans. He would perhaps make some necessary changes to better adapt the mine to his own market and to better exploit the operating and production skills of his own mining staff.

3. Estimate the cost of making necessary changes. His study of the inspection report would give him a good idea of how much should be spent, and where it would do the most good.

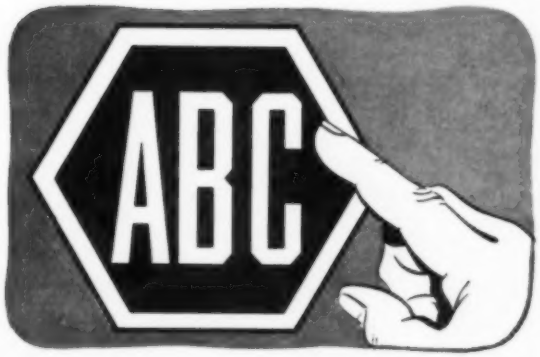
4. Set up a projected cost sheet in complete detail to provide a definite target at which the new owner's efforts could be aimed.

This procedure can be followed by any owner who wishes to continue operations at his own mine. It provides the best known method of getting costs under control—and keeping them under control.

The Reader Is Boss

or... How ABC Helps You Run The Magazine Business

Readers who pay for magazines are always ripe for new ideas, new information, new trends and new technological developments. By giving or withholding their subscription money, reader-customers vote for or against editors and publishers. Counting these "votes" is the important job of the *Audit Bureau of Circulations* – the watchdog of the publishing industry.



YOU CAN TELL which magazines have fully-audited paid circulation when you see the ABC symbol on their cover or contents page. This is the symbol that stands for the Audit Bureau of Circulations, a cooperative organization that sets standards of good business conduct for its publisher members.

ACCURATE FIGURES – ABOUT YOU are the heart of ABC's job. ABC does a candid, unbiased, certified audit of all subscription figures of member magazines – and of the subscribers' jobs, functions, and locations. These audits help editors to tailor the contents of their magazine to your specific job interests.

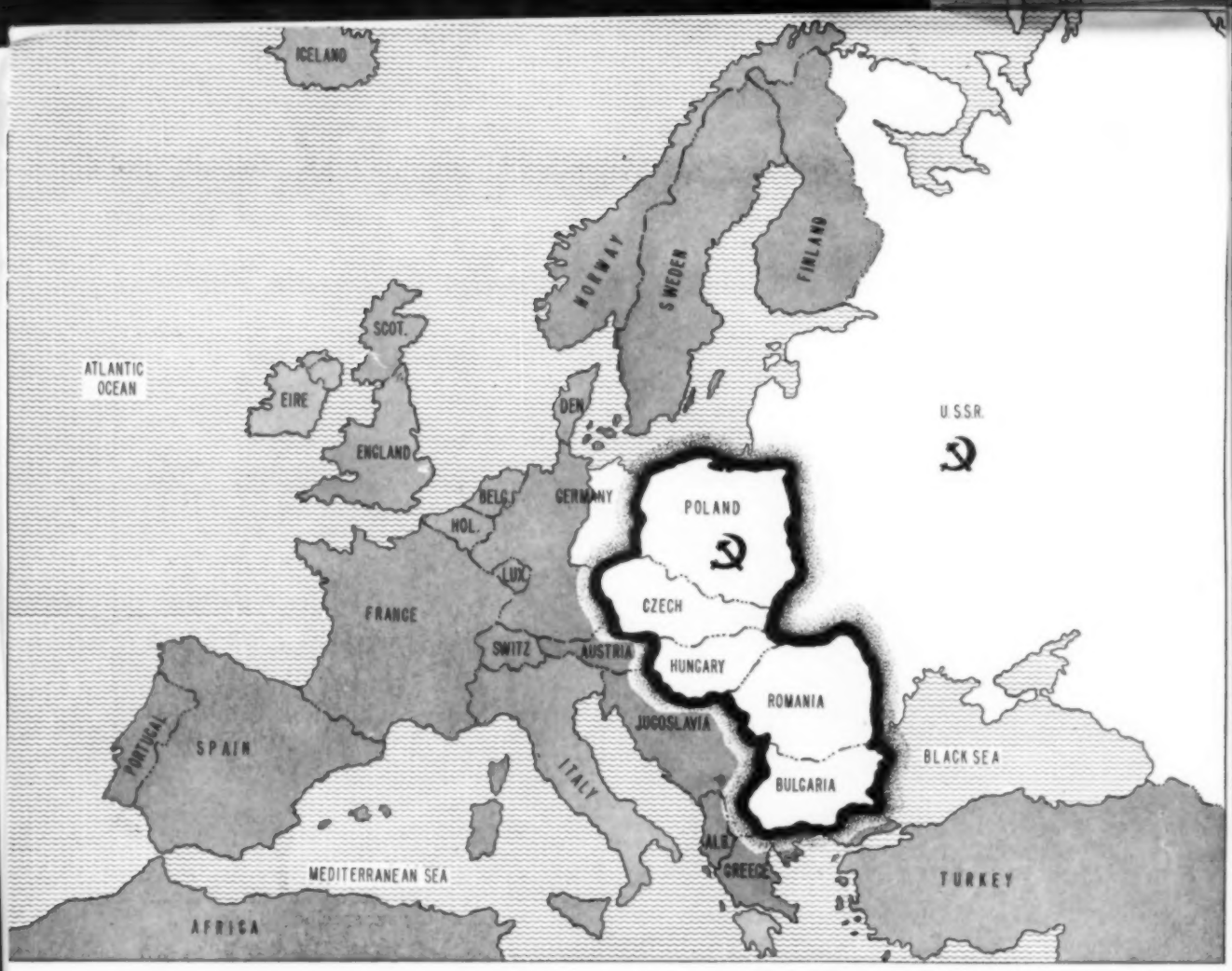
YOU'RE THE BOSS when you pay money for any magazine. Your vote of confidence and your renewals of subscriptions are dominant in the thinking of editors and publishers. Advertisers are vitally interested, too, and their support helps earn the dollars needed to do a stronger, more useful editorial job for you.

YOU, THE SUBSCRIBER, WIN when you buy ABC magazines, for this mark is your assurance that you are getting a publication tailored to your needs. McGraw-Hill has been a charter member of ABC and has supported its aims continuously for over 40 years. And ABC, in turn, is responsible in many respects for the high standard of business magazine publishing today.

McGRAW-HILL MAGAZINES

McGRAW-HILL PUBLISHING COMPANY, INC.

330 WEST 42nd STREET, NEW YORK 36, N. Y.



STATE PLANNING, under the aegis of hammer and sickle, has brought dilemma to countries producing . . .

Coal in Captive Europe

Communist planners have misjudged the labor, materials and efficiency potentials of the coal industry in Poland, Czechoslovakia, Hungary, Bulgaria and Romania. Results:

- **Unrealistic production targets have not been reached.**
- **Output has increased but mostly in inferior brown coals and lignites.**
- **Labor productivity has fallen and mining costs have risen.**
- **Industrial and domestic coal needs still outstrip supply.**
- **A critical shortage of skilled labor casts doubt on any real future progress from increased mechanization.**

LAST FEBRUARY the blizzard that fell upon Europe brought loud alarms in Warsaw, Prague and Budapest. Radio Prague appealed to all workers for help in overcoming a shortage of fuel and power. Miners in Poland went on 11-hour shifts to combat a "serious coal deficiency amounting to 655,000 tons." The situation grew so critical that on the night of Feb 16 the Warsaw power plant had "practically nothing" with which to fire the boilers, and the people were forbidden to use electric heaters. In Hungary a few days later the Ministry of Coal

Adapted from *News From Behind The Iron Curtain*, published by the Free Europe Press, Free Europe Committee, Inc.

Mining ordered the miners out on Sunday; the shock of the coal shortage was felt all over the Hungarian economy. The regime was forced to reduce production in the building material and textile industries; the railroads were unable to fulfill their obligations; and "more than 8,000 tons of rolled goods" were left waiting at the Borsod steel mills.

Coal is so vital to the captive economies that a prolonged shortage would paralyze them. Not only is coal the chief fuel for trains and factories, but it is also the prime source of electric power. In 1950 hard coal and lignite supplied more than 85% of the total industrial energy in Bulgaria, Czechoslovakia, Hungary and Poland. In the form of coke, coal operates blast furnaces for smelting iron ore. Its by-products—light oils, coal tar, and the important coal-tar derivatives—are raw materials for a number of industries including synthetic fuels, explosives and other chemicals. The whole structure of the ambitious economic plans rests perilously upon this black mineral.

Though the regimes have managed to raise the output of coal and lignite far beyond prewar levels, the periodic crises in fuel supplies show that their success has been only relative. Demand for coal, especially hard coal of industrial quality, continually threatens to outstrip the supply. In 1937 the production of hard coal and lignite in the area bounded by the present frontiers of Poland, Czechoslovakia, Hungary, Romania and Bulgaria was about 120 million metric tons. By 1955 it had risen, according to regime reports, to over 200 million tons. These totals indicate only the general magnitude of the effort, since they include coal of all types and grades. Taking hard coal alone, production has risen 42%—from about 84 million tons in 1937 to 119 million tons in 1955. On the other hand, the inferior brown coals and lignites have expanded by 120% from 37 million tons in 1937 to 82 million tons in 1955.

The orbit's primary coal area is the Upper Silesian Basin, shared by Poland and Czechoslovakia. More than 80% of the hard-coal reserves are situated there, and its prewar production surpassed that of the Donets Basin in the Ukraine. Another hard-coal center is in Lower Silesia, extending from Poland into northern Bohemia. Smaller hard-coal fields exist in Czechoslovakia (Kladno, Plzen, Trutnov and Posice), in Hungary (chiefly around Pecs), Romania and Bulgaria. But Poland and Czechoslovakia have at least 98% of the known and probable deposits of hard coal, and they produced that share in 1955.

Satellite Coal: How Much and Where

Millions of Metric Tons

	Hard Coal			Other Coal			Total		
	1955	1946	1937	1955	1946	1937	1955	1946	1937
Poland	94.5	47.3	66.0	6.0	1.5	6.6	100.5	48.8	72.6
Czechoslavakia	22.1	14.1	16.7	40.1	19.5	18.0	62.2	33.6	34.7
Hungary	2.1	0.7	0.9	20.2	5.6	8.1	22.3	6.3	9.0
Bulgaria	0.2	0.1	0.1	10.2	3.4	1.8	10.4	3.5	1.9
Romania	0.4	0.2	0.3	5.8	1.8	1.9	6.2	2.0	2.2
Total	119.3	62.4	84.0	82.3	31.8	36.4	201.6	94.2	120.4

Hard coal refers to bituminous coal and, in some cases, may include small quantities of anthracite; *other coal* includes brown coals and lignites. Roughly estimated: other coal production in Poland, 1937; the breakdowns of hard and other coal output in Hungaria and Romania, 1955, and in Bulgaria for all years.

Output Targets Too High

In 1949 Czechoslovakia and Bulgaria began their First Five Year Plans, followed in 1950 by Hungary with its Five Year Plan and Poland with a Six Year Plan. Albania and Romania began their Five Year Plans in 1951. The object of all these plans was to raise industrial production by amounts varying from 57% in Czechoslovakia to 150% in Poland, with particular emphasis on heavy industry. The targets for coal were very ambitious:

Poland's output of bituminous coal was to rise by 35%, reaching a level of 100 million tons in 1955; Czechoslovakia's was to reach 20.8 million tons in 1953, an increase of 18%. Simultaneously the production of brown coal and lignite was to go up by 83% in Poland and 36% in Czechoslovakia. The other regimes had similar goals: in Hungary the general output of coal was to increase by 57%, in Bulgaria by 47% and in Romania by 193%.

Most of the regimes have not been able to reach their postwar planned targets, even by the fairly crude measure of gross tonnage produced. The most serious shortfall was in Romania, where the industry missed its target by close to 30%. But both Poland and Czechoslovakia, the chief coal producers, also fell short.

To make matters worse, in some countries the rising output figures have been accompanied by a decline in the average calorific value of the coal. In Hungary, for example, the supply of inferior quality lignite quadrupled between 1947 and 1952, while that of good quality lignite did not even double. Taking all grades of coal and lignite together, the average calorific value in 1952 was only 90.9% of what it had been in 1948. In Bulgaria some of the coal produced is so poor that household consumers refuse to buy it, and even the higher grade industrial coal is often so full of such impurities as earth, stones and ash that users protest at it.

For the public, which consumes coal as fuel and in the form of electric power, communist planning has frequently meant deprivation. Since the plans give priority to heavy industry, and since industry in turn has priority on the higher grades of coal, private consumers are likely to be left with an inadequate remainder. In Czechoslovakia and Bulgaria the regimes have adopted a policy of substituting inferior coal for bituminous in as many areas as possible. In Hungary the press is full of complaints about inadequate coal supplies for homes, offices and public lighting. A more detailed roundup of the coal situation in each country follows.

POLAND

As the region's chief supplier of bituminous coal, Poland's performance in coming years will be crucial for the whole satellite economy. Poland has always been a coal exporter. Between the two wars its exports of bituminous coal averaged around a third of its total output, the bulk going to the Scandinavian countries and Western Europe. Since the communists took power Polish exports have continued at the same level, but the Soviet Bloc is now the chief recipient. In 1950 a third of the exports went to the USSR and more than a fourth to the satellite area.

Of total exports to the Soviet Bloc in 1950, about a fifth went to the Soviet Zone of Germany. Czechoslovakia, straining under its Five Year Plan, received 24%. Figures for more recent years do not allow an analysis of Poland's exports to the Soviet Bloc, but in 1954 those countries absorbed

SURFACE MINING IN CZECHOSLOVAKIA—Giant excavator K-1000 fills an entire set of large coal carts in minutes.

QUESTION: Why has the use of high capacity equipment in Europe's captive coal mines failed to boost output to desired levels?

ANSWERS: 1. The orbit's industrial economy is not geared to supply the equipment needs of a rapid expansion in coal output. 2. Mine management is unskilled in how to achieve, and labor reluctant to accept, the benefiits of more mechanization.

SILESIAN COAL BASIN—Industry strains to meet the needs of ambitious communist economic planning.

more than 72% of total coal exports.

Poland has been pressed between the demands of its export trade and the demands of its own growing industry. Between 1949 and 1954 domestic consumption rose from 48 million tons to 66 million tons while bituminous coal output rose from 74 million tons to 91 million tons. The difference between the increase in consumption and the increase in output is covered by a slight decrease in exports, from 27 million tons to 25 million tons. The regime's economic planners evidently regard a high level of exports as virtually unalterable, and they have tried to cover the growing domestic demand by raising output as rapidly as possible.

Because of its vast resources in bituminous coal, brown coal is of relatively small importance in Poland. However, the regime has tried to expand production in the more accessible brown-coal deposits to relieve the strain on bituminous supplies. Nearly all the brown coal comes from surface mines in the western provinces, especially from Turow. It has a low calorific value and a high moisture content, but it is used in the electric power, glass and ceramic industries, and as a domestic fuel. The Six Year Plan target of 8.4 million tons was only 70% fulfilled, mainly because of delay in opening new mines.

CZECHOSLOVAKIA

The other big producer of hard coal, Czechoslovakia, has not borne the load of communist planning as well as Poland. Before the war Czechoslovakia produced more than enough bituminous coal for domestic consumption and even exported some in the form of high-quality coke to Austria, Hungary and Poland. But the communists have raised the industrial demand for bituminous coal faster than the ability of the mines to supply it: in 1952 the output of bituminous coal was 20% greater than in 1937, while industrial demand had risen by 112%. The First Five Year Plan (1949-1953) set the target for 1953 at 20.8 million tons (as compared with 16.7 million tons in 1937 and 24.6 million tons in 1943 under German occupation). The target was later upped to 24.8 million tons. Neither of these targets was reached, though the actual output in 1953, 20.3 million tons, was close to what had originally been planned.

In order to close the gap between production and consumption drastic measures had to be taken. Imports of bituminous coal from Poland were increased; some medium and small industries had to curtail their operations; and the use of bituminous coal by households was cut considerably.

During 1954 the production of bituminous coal increased by 6% and in 1955 it went up to 22.1 million tons, but the position was still difficult. On Oct. 1, 1955, First Deputy Premier Dolansky referred to the coal situation as "tenuous." He admitted that "the tempo of growth in the output of coal in the years of the First Five Year Plan did not correspond to the rate of growth of the other branches of the national economy . . ." The nub of the difficulty, according to Prague Analyst Karel Matous, lies in the demand of the metallurgical industry for coke—not only Czechoslovakia's industry but that "of the majority of the other European people's democratic states . . ." During the Five Year Plan, he writes, "the increase in the mining of hard coal was primarily intended for covering the increased need for . . . coke. In some periods this increased need . . . was even higher than the total increase in output. As a result, it became necessary to substitute brown coal for hard coal in other areas of consumption . . ."

The production of brown coal and lignite far exceeds the output of bituminous. The original Five Year Plan target for brown coal was 32.2 million tons, about 17% above the wartime high of 27.6 million tons. Subsequently the target was raised to 38.3 million tons and in 1955 it was 40.7 million tons. Greater success in brown-coal mining was attributed by Matous to the fact that while "hard coal is mined in deep mines, the mining of brown coal is oriented more and more towards surface mining, characterized by greater mechanization . . . The construction of a deep mine takes considerably longer than the opening of a new surface mine and requires a far greater amount of human labor, investment, materials and total expense in general."

The substitution of brown coal for the precious bituminous has been pushed wherever technical requirements permit. Substitutions have occurred not only in household and railroad use (the major outlets), but also as part of the total bituminous requirement in thermoelectric power stations and in the production of coke.

HUNGARY

The squeeze has been hardest in Hungary, where coal output had not responded to the high hopes of the planners. The First Five Year Plan called originally for a coal output of 18.5 million tons in 1954. In the first revision, targets were generally raised: for all industry by more than a third; for heavy industry by nearly 100%; and for coal mining by almost 50% to 27.5 million tons. The revised coal target proved to be impossible of fulfillment and was again lowered in 1953 to 22.6 million tons.

While the mines managed to produce 22.1 million tons in 1954, a quantity close to the revised target set in 1953 and considerably in excess of the original target of 18.5 million tons, this was offset by a continued decline in the quality of the coal. The major part of the 87% increase since 1949 had been in lignite, especially in poor-quality lignite. The United Nations, translating the gross output figures into hard-coal equivalents, estimated the increase in calorific value to have been only 58%. Because of the scarcity of good coking coal, Hungary was forced to import more than 90% of its coke in 1955.

BULGARIA

In Bulgaria the regime has encountered the same problem of getting enough good quality coal for its industrial purposes. During the First Five Year Plan, scheduled to run from 1949 until 1953, coal output was to reach 6.55 million tons. Early in 1953 the regime announced that the plan had been fulfilled in 4 yr instead of 5, and that coal output had exceeded its target, reaching 340% of the 1939 level, or about 7.4 million tons. But later in the year Minister of Heavy Industry Pano Tsolov warned that "our coal industry is lagging behind the ever-growing economic needs. A number of mining enterprises and research projects have not fulfilled their production plans . . . The nonfulfillment of the plans caused heavy losses to the consumers and hindered their work . . . There are enterprises which have had to reduce their capacity because of poor-quality coal or an insufficient supply of coal."

In April, 1953, the Council of Ministers, and the Party's Central Committee, issued a decree on the development of the coal industry, which showed great concern over the industry's failure to supply the developing economy with sufficient coal. The decree stated that by the end of the Second Five Year Plan in 1957, coal production must be 89% above the level of 1952. The output of lignite was to rise by 168%, brown coal by 60%, bituminous by 152% and anthracite by 100%.

At the end of the First Five Year Plan in 1952, industry consumed 55% of the total coal supply. This was about 80% more than the total production of coal in 1939. Industrial consumption of coal is expected to rise during the Second Five Year Plan

by 83%. Consumption in the metallurgical industry will increase by 333%, in the electrical and chemical industries by about 82%, in the building materials industry by 92% and in the food industry by 40%. Considering that total coal output is to rise by only 89% during the plan, it is obvious that considerable use must be made of lignite, the production of which is to expand more than other types. While in 1952, 31% of industrial coal consumption consisted of lignite, by 1957 the proportion is expected to be 43%.

The substitution of lignite for higher quality coal has been pushed considerably. The railroads, which accounted for almost a quarter of total coal consumption in 1952, have been using lignite for years. An editorial in *Trud* (Sofia), April 10, 1953, commented that "locomotive operators do not argue any more about how to economize on coal, or whether to mix coal with lignite . . ." A special decree of July 7, 1953, ordered ministries and enterprises to adjust their steam boilers to accommodate coal of lower calorific value. Lignite is also used for electric power production. The lignite campaign reached what may have been its limit in 1954, when the Ministry of Trade advertised a new contest for inventors. The Ministry offered a prize to the most successful inventor of a cooking stove for restaurants that would "burn lignite with 50% moisture content and an average of 1,600 calories."

Why The Plans Have Failed

The persistent coal shortage in the orbit and the failures to achieve plan targets show that the communists miscalculated the possibilities of the industry. The plans were based on certain assumptions with respect to manpower, materials and efficiency which have since proved to be unrealistic. The problems and mistakes varied from one country to another, but common to all of them was the basic fallacy of much communist planning.

Although coal is a prime commodity in the industrial economy, it is not independent of what happens in other industries. The building of new mines, and the introduction of cutting machines, mine railways and other means of increasing production are dependent on the performance of the steel, machinery and construction industries, and also on an adequate technical personnel to put such measures into effect.

Moreover, the development of coal mining requires manpower, a factor which has become increasingly scarce because of the demand for it in other expanding industries. Not just any kind of manpower, but a type of worker willing to adopt the new techniques offered to him and having an incentive to increase his production. In all of these respects—varying according to the situation—the satellite coal industries show the results of miscalculation.

In Poland the fault is attributed to inadequate investment. The Six Year Plan had provided for the building of 11 new coal mines, with a total production of 9 million tons, and the construction of 36 new levels in the already existing mines. However, only 6 new mines were put into operation and only 19 new levels were built. Apparently the cost of this new construction was underestimated, as well as the amount of time it would require. There is evidence that other factors were more important, including lack of manpower, insufficient mechanization and poor administration.

In Czechoslovakia the regime has attributed its coal difficulties to three major causes: a delay in building new mines, inadequate mechanization, and a chronic shortage of manpower. The failure to open new mines evidently came from overoptimistic estimates of what the existing mines could produce. First Deputy Premier Dolansky said, late in 1955: "Lack of clarity in this basic question cost us 7 yr of delay in the building of new mines . . . and only soviet expert analysis changed matters." But it is difficult to see how the regime could have exploited new mines without closing or reducing operations in others, since it has admittedly failed to recruit enough workers to man the existing mines. The manpower problem is heightened by a lagging rate of productivity, not only in mining but throughout the economy. Productivity has risen, according to the official statistics, but not as rapidly as the planners had hoped.

Another miscalculation seems to have occurred on the consumption side of the balance. Dolansky, in his speech of October, found that "the direct consumption of coal and its use in transportation, power and other branches are, because of the low technical level of equipment and the little care given to economic operations, exceedingly high, and the efficiency of fuel utilization low . . ."

In Hungary the chief difficulties seem to be the lack of an adequate, well-disciplined labor force and a failure to raise the productivity of the workers fast enough to meet plan requirements. The regime claims to have made great strides in mechanizing the mines, but at the same time it complains that not enough use is made of the new machines. In May, 1955, the deputy minister of coal mining, Dr. Ferenc Kassai, wrote:

"Although production has doubled, this has not been achieved by increased mechanization and greater productivity, but mainly by an increase of manpower. Through extensive hiring the standard dropped, and because of the lower average production a great deal of overtime was required. In addition, worker turnover was very high, which was further aggravated by the fact that there are no workers' dwellings close to the mines and miners must cover long distances by train, bus, bicycle and even on foot in order to reach the mine.

"Work discipline has not improved sufficiently since the communist seizure of power; on the contrary, during recent years it has shown signs of deterioration. This means not only a high percentage of unwarranted absenteeism and neglect of technological and safety measures, but also uneconomical use of working time and a compromising attitude on the part of technicians. There is much to be desired also in the sphere of technology. Despite a certain improvement in mining procedure, the situation is not satisfactory because there is still a great deal of badly planned mining with little regard for the future."

The Romanian industry fell so far short of its target in 1955 that it incurred severe criticism by First Secretary Gheorghiu-Dej at the Second Party Congress in December. Despite enormous capital investments during the Five Year Plan, labor productivity had actually declined by 8%. "The reason for this intolerable situation lies in a lack of concern by the Ministry of the Coal Industry and the various mining departments for the full use of the equipment and machinery at the disposal of the mines and for the introduction of mechanized cutting, loading and underground transport."

This comment, however, did not go to the root of the problem: an obvious reluctance on the part of workers to adopt the machines and techniques prescribed for them. In Romania, as elsewhere in the orbit, the regime has drawn much of its new labor supply from a peasantry unused to the gadgets of industrialism. Workers like these do not seize quickly upon air compressors, cutting machines, combines, etc., and operate them with the efficiency that the planners evidently hoped for. The problem is intensified

by the regime's haste in recruiting workers and sending them into the mines without much training. In the past a worker was not allowed to work independently underground until he had several years of experience, but now the communists are producing miners with only 2 wk of training.

In Bulgaria the coal crisis has been officially attributed to poor planning. A decree of the Council of Ministers and the Party Central Committee, issued in April, 1954, ran as follows:

"The main reason why the coal industry lags behind the growing needs of the national economy is that the ministry of heavy industry and the State Planning Commission did not adequately study the industrial demand for coal and did not weigh the heavy inheritance of the past. Because of this, during the First Five Year Plan the planning of capital construction was admittedly incorrect. Construction of new pits was not begun and the planning of geological research was not designed to establish industrial coal reserves through the planning and construction of new pits.

"Because of a lack of trained engineering and technical cadres—mining engineers, geological engineers, geologists and mining technicians—the timely solution of a number of technical problems . . . has not been achieved."

The decree ended with four directives for the industry during the Second Five Year Plan. They stressed the need for more coal, more capital investment in coal mining, more geological research aiming at the opening of new mines, and the creation of a body of expert engineers, technicians and workers.

Labor Shortage Critical

The orbit's coal planners have emphasized mechanization as a means of raising output but this has not overcome the shortage of manpower that plagues the industry. The shortage has appeared not only as a recruiting problem but in the related problems of high turnover among workers, excessive absenteeism, and the difficulty of enforcing discipline among men who know that the employer needs them more than they need him.

The satellite regimes have taken all sorts of measures to get more workers into the mines and keep them there. They have offered miners higher wages and better food and housing than other workers get. The Polish Miners' Charter of Nov. 30, 1949; gave wage increases of from 5 to 20%, paid vacations, pensions, housing priorities, free coal and other prerequisites, raising the real wages of coal miners to a level 15 to 25% above the average for other industrial workers. Czechoslovakia offers a bonus of 1,200 koruny (about 2 wk salary) to any worker who enters mining for at least 3 yr, as well as preferential rights to new apartments. Throughout the orbit similar incentives have been created, and much is made of them in recruiting propaganda. However, they have not proved adequate, partly because the reality has not been as good as the promise, and partly because the advantages received are not great enough to offset the disadvantages of being a miner.

Higher Costs Inevitable

Even if there had been no mistakes in planning and administration, the pace at which the communists have exploited their coal resources would have meant an inevitable increase in the cost of coal (in real terms). For one thing, much of the coal being dug in Hungary, Romania and Bulgaria is of a distinctly marginal quality that would not be worth mining except to meet an extraordinary demand. For another, the supply of experienced workers and technicians was at best far below the requirements, and inexperienced workers—particularly in a time of labor shortage—are certain to be less productive. Output per man-shift in Polish underground mines rose until 1949, when it was 1,830 kilograms, and after that it declined to 1,733 in 1954. In Hungary, output per man shift fell more than 20% between 1950 and 1953.

These factors, added to inefficiency and errors in planning, have made coal an expensive commodity in Eastern Europe. In Poland, unit costs were expected to fall during the Six Year Plan, but instead they rose by 4% from 1950 to 1954. In Czechoslovakia hard-coal mining, unit costs rose by 39.4% from 1949 to 1953, according to the Minister of Fuel and Power. In Hungary production costs were 30% higher in 1954 than in 1951. To the direct production costs must be added the social costs arising from the coal shortage. The need to substitute lower-grade fuel in many uses—such as transportation and heating—has meant a public sacrifice that is never expressed in the figures published by the regimes.

The Future: Output Up But Planning Unrealistic

In the years just ahead, the drive for more coal will continue. Poland aims at an output of 110 million tons of bituminous coal in 1960. Czechoslovakia plans for about 29 million tons of bituminous coal in 1960, and about 58 million tons of brown coal and lignite. Romania is to raise its production to 11 or 11.6 million tons, an increase of 80 or 90%. Bulgaria's Five Year Plan ends in 1957 with a target of 14 million tons. Hungary's target is 29.4 million tons, an increase of 33% for black coal and 38% for lignite. The regimes are evidently taking steps to remedy the problems that beset them in the past.

Most of them are emphasizing higher labor productivity since manpower will continue to be tight and increases in production will have to come from greater output per worker. This means a drive for more mechanization, a point which has been spelled out in detail by regime spokesmen in Poland, Czechoslovakia and Hungary. There is also to be an expansion in the number of mines, particularly in Poland and Czechoslovakia, and a continuation of the areawide drive for more efficiency in the consumption of coal.

So far the orbit's coal planning has given the appearance of a crash program designed to carry the satellites through the early phases of a rapid industrialization. Presumably the planners recognized that the program would involve short-run costs that would seem excessive when measured by normal standards. To the extent that this was given rational consideration, the intention was to make up for the short-run costs by the long-run advantages of industrial growth. As the level of technology rose, and with it the skill and discipline of the workers, productivity in coal mining would rise also. A more efficient economy should logically make better use of existing fuels. The growth of the electric power industry, even if based on coal, would mean additional economies in consumption. And the future development of new energy sources—water power and eventually atomic energy—would free the satellite economies from their dependence on coal.

This chain of economic reasoning, of course, omits the human factor altogether. Like all communist planning, it mortgages the present in favor of the future and sacrifices the freedom and comfort of the present generation for the presumptive happiness of its descendants. Since most human beings are reluctant to sacrifice themselves to any abstraction, no matter how splendidly colored, the tyranny of reason has to be implemented by the tyranny of the state. Coal production will rise undoubtedly; but the means of production will continue to be not only miners and their tools but police and the fear of consequences.

The Coal Commentator

Mandatory

Changing conditions bring changes in men, equipment and practices in coal mining as in all other forms of human endeavor. The one outstanding fact in coal today is the high cost of both equipment and labor—a cost that probably will continue to rise at least for a time. This means that both men and machines must produce at higher and higher rates per hour and per shift. Otherwise, the burden on the consumer would grow unbearable and substitutes would be resurrected in even stronger guise.

One new development is the entrance of the industrial engineer into the production picture to supplement the efforts of both management and other engineering talent. Incidentally, it might be observed that the industry could use more of the latter, as well as the former. Howsoever, there are now a respectable number of industrial and production engineers on the job, and more can be expected, since they give direction and impetus to efforts aimed at getting the most out of coal-production facilities. This includes stepping up maintenance, the importance of which is accentuated by every addition to the list of production machines. As more and more of the attention it deserves is devoted to maintenance, there should be a major increase in the number of maintenance engineers, now distinctly in the minority in numbers. In fact, an increase is mandatory.

Electric Ventilation

Principle into practice frequently is a frustrating operation, especially in mine ventilation. Consequently, your commentator, who has enjoyed his share of the frustration involved in trying to plan efficient ventilation layouts, and then keep them efficient, is pleased to pay belated tribute to the experts in the Ventilation Section of the U. S. Bureau of Mines, at Pittsburgh. Their latest brainchild is an electrical network analog computer, which can figure just how a proposed change in ventilation methods would work out in practice. **The possible savings are really impressive. Cost of the machine is $18,000 and in one instance alone it prevented the spending of $30,000 on a plan that would not have worked out in practice.** Perhaps it would pay to get on the list early if there is reason to believe that ventilation is less than reasonably efficient.

Courting and Coal

The wooing of the female by the male at times has the most unexpected of ramifications. In Great Britain, according to Gordon Manley, professor of Geography, Bedford College, at the recent meeting of the British Association, "Courting customs in different parts of the country make a difference in coal stocks." He was referring to the lighting of grates in preparation for the arrival of the suitor for the daughter's hand in certain sections of Great Britain, perhaps to help with the cold feet that sometimes is said to mark such occasions. Ergo, coal use goes up.

Practice in the United States? Here, courting nights are more like to run up the gasoline consumption. Even if the young folks stay home, there is not too much reason to expect that coal use for electric lights will rise. On the contrary, unless the habits of young people have changed.

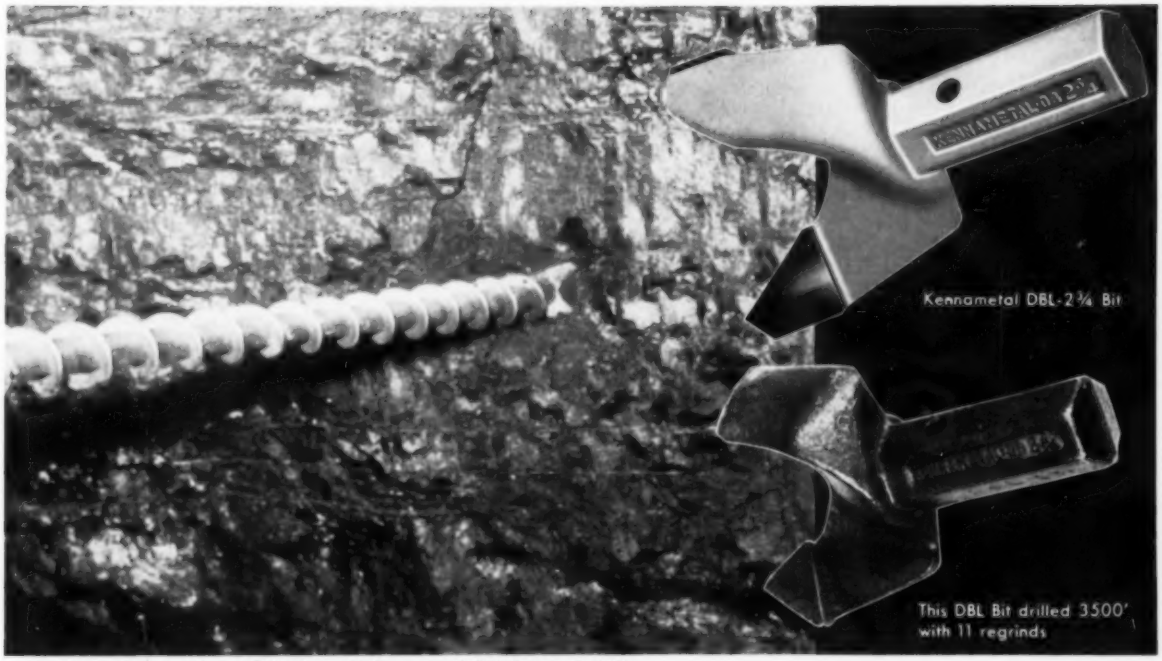
Through the Barrier

Overseas exports continue to be the most surprising of coal's markets. At the end of July, the bituminous rate broke the million-tons-per-week mark for the first time in this modern overseas-trade era. And with good news came the additional good word that the government is going to meet American Coal Shipping, Inc., almost all the way in its request for Liberty ships for the Atlantic run, and also made known that it would look with favor on other requests for ships for the coal-export trade.

Is the next mark two million a week? It could well be, since this is not too much over the rate that would bring about the 100-million-ton total that is being forecast by Walter Tuohy, of the Chesapeake & Ohio, among others. Certainly the total looks more likely now than it did a year or two ago, especially in view of the growing attention being given to insuring satisfied customers through quality, service, minimum cost and low ocean freights.

Complete and Unified

"The most complete and unified compendium of science and technology ever assembled"—thus reads the advance release on "The McGraw-Hill Encyclopedia of Science and Technology"—probably 10 volumes, 7,000 oversize pages, and available in about 3 yr. Its aim is to provide a quick and convenient reference for any one seeking information on scientific or engineering subjects, whatever their nature. McGraw-Hill contracts to keep it up to date, and will supplement it with "The McGraw-Hill Yearbook in Science and Technology" covering annually the scientific and technological developments of the previous year. So, your commentator humbly suggests a note somewhere so it won't be overlooked.



Face drilling at Enoco Collieries with Kennametal DBL Rotary Drill Bits

KENNAMETAL* DBL-2¾ BITS ARE USED AT ENOCO COLLIERIES

because they provide: low bit costs: 8½ mills per ton . . . low power requirements . . . reduced maintenance on drill motors . . . lengthened service life of bits, augers and thread bars

Enoco Collieries, Bruceville, Ind., selected Kennametal DBL 2¾ Rotary Drill Bits for drilling face in tough Indiana #5 Seam . . . but only after completing a series of carefully controlled tests. Results: *55% lower bit cost.*

Kennametal DBL Bits averaged 354 holes from 7′ to 9′ deep. Total bit cost per hole, including cost of an average of 10 resharpenings, was $.0216, or 8½ mills per ton. The second best carbide bit averaged 172 holes at a cost of $.0487 per hole, or 19 mills per ton.

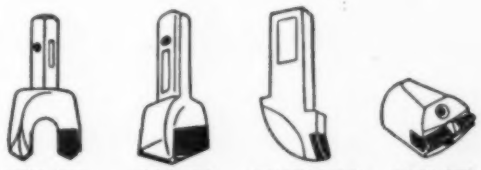
In addition, Kennametal DBL Bits contributed to other important savings. Freer cutting draws less power, reducing (1) wear on thread bar boxing and (2) electrical maintenance on drill motors. The life of thread bars and augers was greatly increased. As a matter of fact, these savings are so important, according to Enoco's superintendent, that DBL Bits would have been Enoco's choice even if bit cost per hole had showed no advantage over other bits.

No matter what your cutting or drilling problems are, you will find a Kennametal Bit that will do the job fast, and provide low bit and maintenance cost and long bit service. Discuss your problems with a Kennametal representative. Why not write today to KENNAMETAL INC., Mining Tool Division, Bedford, Pennsylvania.

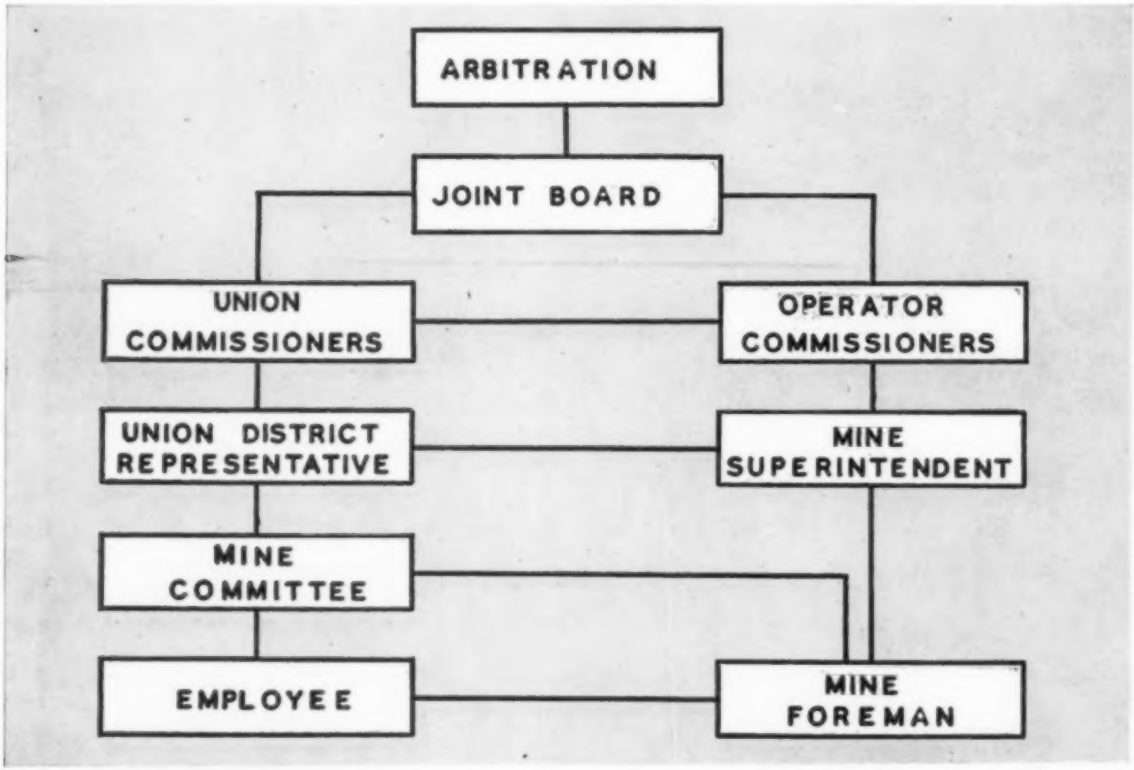
*Trademark

Ask about complete line of Kennametal Cutter Bits, Drill Bits, Roof Bits, Augers, Pinning Rods, Accessories

INDUSTRY AND
KENNAMETAL
. . . Partners in Progress



FOREMEN'S FORUM



GRIEVANCE PROCEDURE IN BITUMINOUS COAL MINING—From 80 to 90% of all grievances are settled at the mine. Today's negotiations among supervisors and their men may show up in a future national agreement.

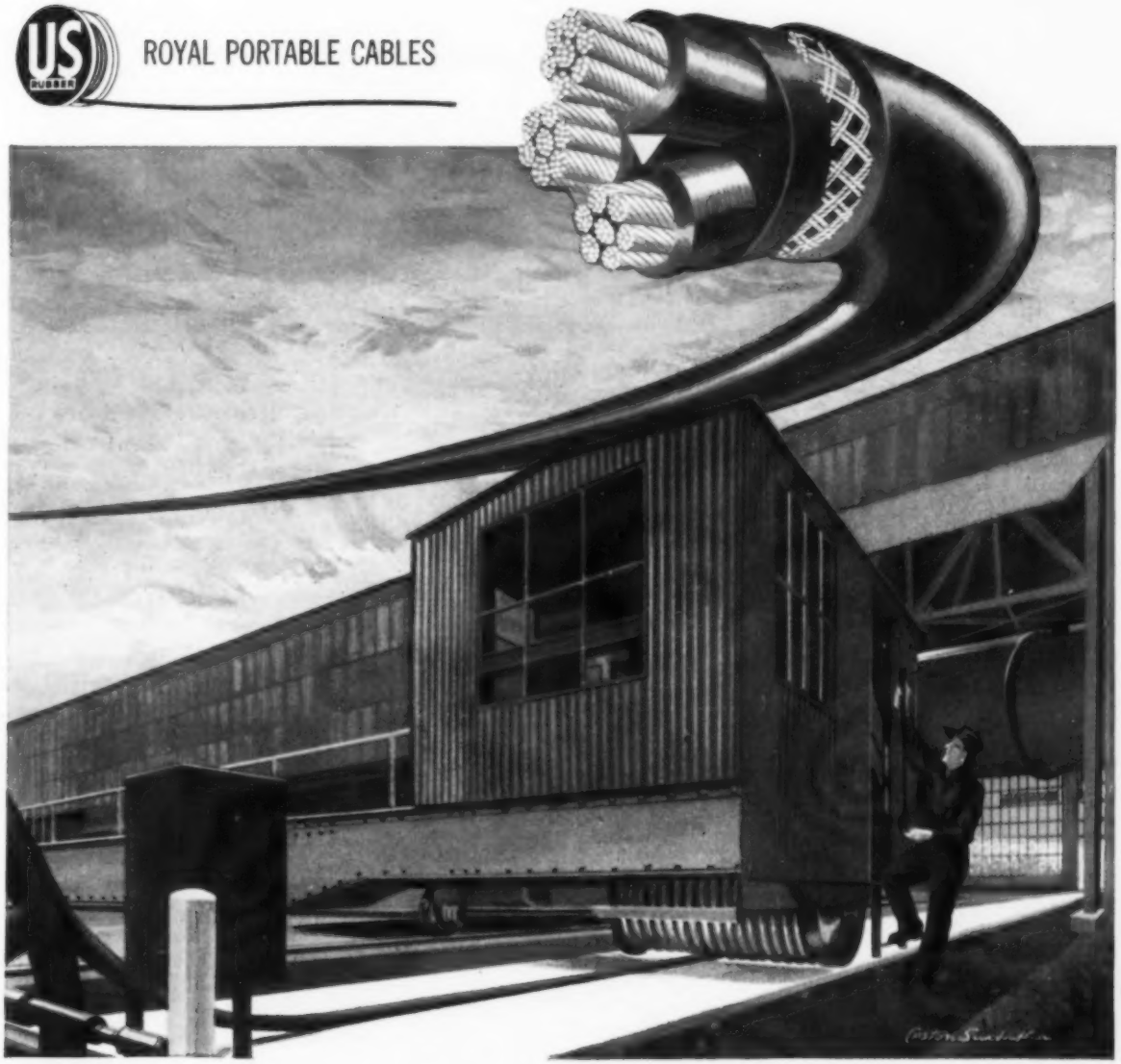
Why Proper Handling of Grievances Is Important

Decisions arrived at in settling individual grievances build up into a code which governs local labor relations. This important phase of collective bargaining calls for skillful negotiating by supervisors.

"GRIEVANCE SETTLEMENT IN COAL MINING," a study that goes beyond a statistical review of the subject, is a recent publication of the Bureau of Business Research of the College of Commerce, West Virginia University, Morgantown, W. Va. Written by Gerald G. Somers, associate professor of economics and director of the Institute of Industrial Relations at the university, the study analyzes grievances and their settlement in two important districts of the bituminous industry, northern West Virginia and western Pennsylvania, and emphasizes the importance of local custom and prior practice in administering and interpreting the national contract.

As explained by Professor Somers, the study is based upon 970 decisions made between 1933 and 1954 through procedures established by District 31, UMWA, and the Northern West Virginia Coal Association, and 83 decisions made between 1943 and 1954 by the Joint Board and umpire established by Districts 3, 4

ROYAL PORTABLE CABLES



Still in Service after 29 years, 24 hours a day

and without a single splice, patch or power failure!

This amazing record was made by a 175-foot length of U. S. Royal portable cable installed in 1927 as a source of power for a traveling agitator in a cement plant*. This three-conductor cable has been fully exposed to weather for the entire 29 years. The agitator moves back and forth the length of the slurry basin, and the cable is simultaneously taken up and paid out by a revolving drum.

To "U. S." engineers, performances such as this are not too unusual. They stem, right at the start, from the determination of "U. S." technicians to produce only a *quality* product. This is possible because "U. S." is the only wire manufacturer to grow its own natural rubber, make its own synthetic rubber and its own plastics, assuring complete quality control with the help of unmatched research and manufacturing facilities.

Call on the "U. S." wire and cable specialist to solve any wiring problem. Write United States Rubber Company, Rockefeller Center, New York 20, N. Y.

*Penn-Dixie Cement Corp., Tenn.

Watch NCAA football, Saturday afternoons, NBC-TV

Electrical Wire & Cable Department

United States Rubber

and 5, UMWA, and the Western Pennsylvania Coal Operators' Association.

Fourteen statistical tables in the 44-p study provide valuable information for top management and bosses on (1) the number of grievances settled at various levels in the grievance-handling procedure and (2) the major subjects out of which grievances arise. However, readers of Foremen's Forum may have more immediate interest in the following points which we have abstracted from Professor Somers' observations and interpretations of his data.

IMPORTANCE OF GRIEVANCE-SETTLEMENT PROCEDURES

When viewed simply as a method of resolving the occasional dispute over contract interpretation, the grievance procedure appears to be nothing more than a minor offshoot of the "big show"—the wage negotiations. But when studied over a period of decades, it assumes much more significant proportions, Professor Somers says. Grievance-settling procedures are a "safety valve" in industrial relations, giving vital flexibility to the whole system of collective bargaining. In response to technological, economic and institutional changes, the day-to-day functioning of the grievance procedure can bring about, over a period of years, a relatively peaceful revolution in the relationship between employer and employee.

If national negotiators attempted to make the initial adjustments to all these changing pressures, instead of merely giving formal recognition to modifications already accomplished at the local level, the revolution, if it came about at all, would probably be accompanied by additional national conflict.

In contrast with formal contract negotiations, it is a virtue of grievance machinery that it operates informally and unobtrusively in solving one problem at a time. It can give as much weight to local custom, practice and oral understandings as to the formal language of a solemnly negotiated agreement.

The individual solution to a problem is not necessarily binding in future cases and can be reversed if consequences indicate the desirability of reversal. But if the decision proves to be sound, and the problem proves to be basic and widespread, a solution to it already has been forged in the piecemeal settlement of grievances, Professor Somers explains. This contribution to industrial relations through local grievance handling is truly significant, since the study shows that from 80 to 90% of all grievances are settled at the mine, with or without the intervention of a union district representative.

FLEXIBILITY IN COAL'S LABOR RELATIONS

The flexibility which grievance-settlement procedures give to labor relations in the coal industry can best be seen in the responses to technological change and growing union power. The advance of mechanization fundamentally affected the three major areas of local disputes: wage and job classifications, layoff and recall, and discipline and discharge. The effects were great because technology changed the whole productive process—from one which emphasized the position of the individual tonnage miner, working in his solitary room, to one which resembles that of a modern factory. But the progress of mechanization was by no means uniform, Professor Somers notes, and new problems had to be solved where and when they arose, without the benefit of contract guidance. Grievance procedure brought about the initial adjustments which were later incorporated in the formal agreements.

The author gives voice to another important development resulting from the employment of grievance machinery at the local level. If solutions to labor-relations problems are to be successful, they must be acceptable to the parties involved, he points out, and acceptability is influenced by the relative bargaining power of union and management. The United Mine Workers grew appreciably in strength in the period covered by the study and gave ample evidence of this growth in national and local work stoppages. Here, again, the grievance procedure gave flexibility to the process of adjustment by gradually adding to the initial contract's concessions to the miners. While the national union negotiators were making advances in wages and supplementary payments, the local officers were gaining benefits in the areas of seniority, job assignments, and discipline through the grievance machinery.

THE HEART OF COAL'S COLLECTIVE BARGAINING

Grievance settlement is not a mere adjunct of the collective-bargaining process; it is at the very heart of the process, Professor Somers concludes. In conducting the study it was not possible to draw a distinction between decisions which interpret the terms of an existing agreement and those which "legislate" new contract provisions. In some cases the grievance machinery sustained practices which were later incorporated in the formal contract, and in others it subtracted from the existing contract provisions. It accomplished these ends, not through a conscious effort to rewrite the contract, but by solving individual problems as they arose in response to changing environmental conditions.

These results are not now directly applicable to other industries. Grievance settlement in coal mining plays an especially important role in collective bargaining because of the increasing centralization of formal contract negotiations, the impact of technology and the development of union power.

ATTITUDES FOR MINE BOSSES IN HANDLING GRIEVANCES

In the light of Professor Somers' analysis, we can see that a supervisor's responsibilities in handling grievances properly is one of the major phases of his work. There will be clashes of interests as long as our way of doing business exists. We might long for the day when such arguments will cease to develop, but that day is not imminent. Therefore, it behooves all supervisors to accept the necessity of working out grievances with their men or district representatives, and to recognize that a number of individually-settled differences will finally develop into a local code of behavior.

A realization that grievance settlement is so important should convince the supervisor that his company has a big stake in each of his negotiations with the mine committee. All such meetings are important. It is vital, therefore, that the supervisor prepare for these meetings by assembling and assimilating all available facts on the situation out of which the grievance arises. He should not be hurried or harried into a decision because each decision will have to be lived with.

War Declared! . . . on Traffic Accidents

A death toll of 41,000 in 1956. . . . This is the prediction on traffic deaths recently made by the National Safety Council. It will be an all-time high. There will be close to a million-and-a-half non-fatal traffic injuries and the economic loss in this shameful orgy will be more than $4½ billion. This compels action now.

And that is why the National Safety Council has initiated an intensified traffic safety campaign, with the motto "Back the Attack on Traffic Accidents." The campaign will begin in December, usually the worst month in traffic safety and will continue throughout 1957.

Your aid is enlisted. Consider safe driving and the promotion of highway safety education as community responsibilities. Here is a 3-point program the National Safety Council is asking you to support:

1. Support your officials. Almost everyone is in favor of good traffic-law enforcement, but officials seldom hear a word of praise for doing a conscientious job. A pat on the back and a promise of election-time support might work wonders in one's home precincts.

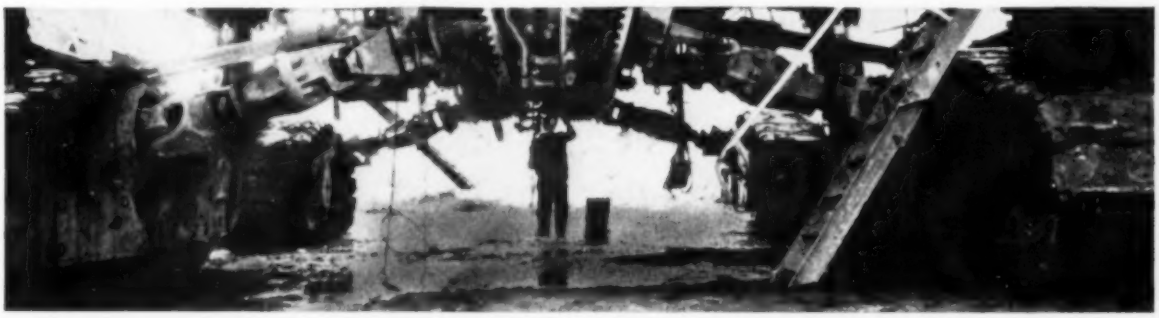
2. Participate in local safety activities. Whether safety is highly organized or only a side activity of the local Kiwanis or garden club, get in!

3. The personal "crackdown." Both drivers and pedestrians should be impressed with the idea that the Christmas holiday season is not the time for a letdown, but a time for extra care.

In every phase of mining

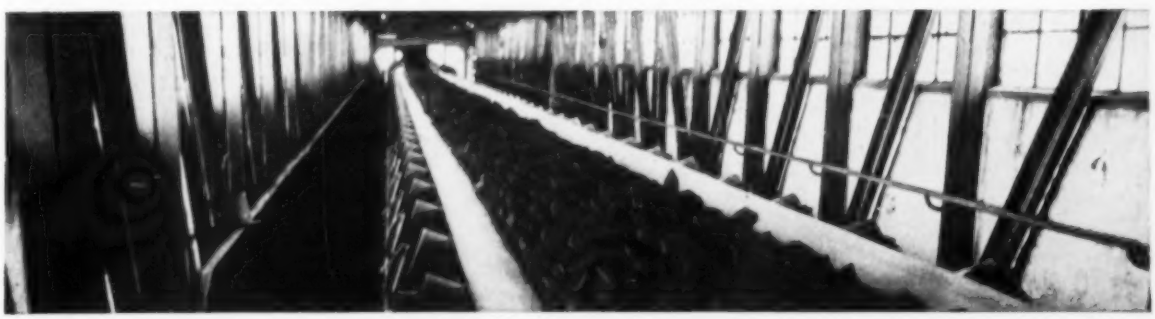
FOR MINE CARS AND ENGINES, Cities Service produces a complete line of highest quality lubricants, specially tailored for rugged, dusty mine operation. Properly applied, these oils and greases can substantially cut haulage costs. . . . Mighty important when you consider these costs now run 20-40% of the total cost of a mine operation! Get the details without obligation from a Cities Service Lubrication Engineer.

Cities Service Lubrication



FOR STRIP EQUIPMENT, nothing surpasses Cities Service Trojan Gear Oils and C-300 Motor Oils. Gears of world's second largest shovel undergo Cities Service treatment. Many strip miners simplify application and inventory with multi-purpose Trojan H Grease. Ideal for bearings, water pumps, all chassis lubrication.

conveys better results!



CITIES SERVICE OFFERS a complete line of lubricants for maximum protection of bearings, belts, trolleys. One major conveyor manufacturer uses only Cities Service lubricants for bearings—scores of miners do the same!

CITIES SERVICE

A complete line of lubricants for every mining need and condition

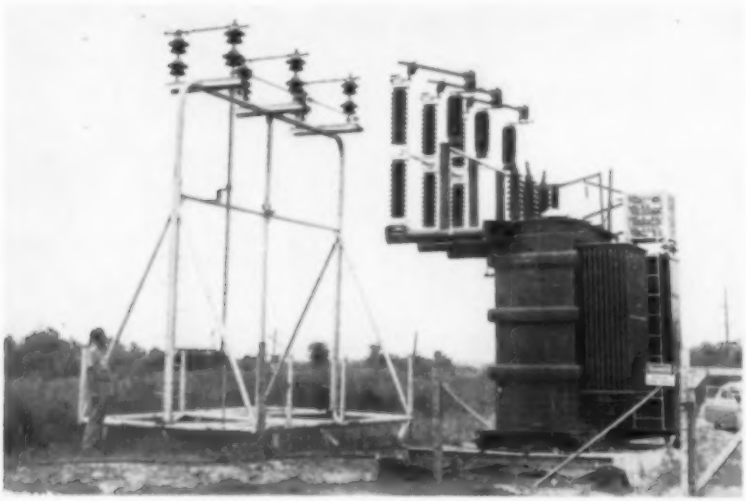
OPERATING IDEAS

Adjustable Four-Arm Unit Drills Fast

FAST DRILLING and mobility are combined in a special four-arm drill developed by the Gibraltar Coal Co., Central City, Ky. The high-capacity machine can drill four blastholes at the same time in 4 ft of hard limestone separating the Nos. 11 and 12 coal at Gibraltar mine. Mounted on a horizontal tube, the distance between the drills may be adjusted to permit blasthole spacing to be changed as needed.

Mounted on a 42T drill frame, the unit has two Gardner-Denver air compressors which are identical with the one in Gibraltar's 50R overburden drill. These units deliver compressed air to four Cleveland D14 jackhammers mounted on the horizontal drill boom. Each of the drills may be operated independently if desired.

A 3-man crew operates the drill, loads and detonates charges. An average of four 2-in-diameter holes are drilled in 4 min. Holes are spaced on 6-ft centers, charged with 1½x8-in Austin 50% gelatin and detonated with du Pont MS delays.



Skid-Mounted Units Easily Moved

MOVING power equipment cross country has been made as easy as possible at the Gibraltar Coal Co., Central City, Ky., by mounting units on skids. The skid-mounted structure shown to the left of the 1,725-v unit substation was made in the Gibraltar shop. The rigid structure was made from pipe welded together to form a sled base and overhead support for the electrical equipment. As soon as the equipment is disconnected from the high voltage line, a bulldozer can tow the equipment cross country to a new site. They then can be reconnected and ready for service in a minimum of time.

Chip Remover Saves Files

CHIPS imbedded between the teeth of a file can be stubborn and often refuse to be budged by a file card. Many men will therefore resort to using a scriber to dig them out. This should be avoided because it may ruin the file and will probably harm the scriber. It also is a slow tedious job to pick one chip out at a time.

Harold Burdett, Tacoma, Wash., says in a recent issue of *American Machinist*, another McGraw-Hill publication, that he has a good method to clean files. For years he has been using a piece of copper tubing, flattened at one end, to rub over the file. This removes the chips with little effort and does not harm the file. The copper, being soft, will adapt itself to any size teeth.

Cord plies spirally applied in
opposite directions, for highest flexibility

BUILT LIKE A TIRE . . .

it's the U. S. Royal Cord Air Hose!

Built like a tire—and *tough as a tire*, with a special construction found in no other air hose:

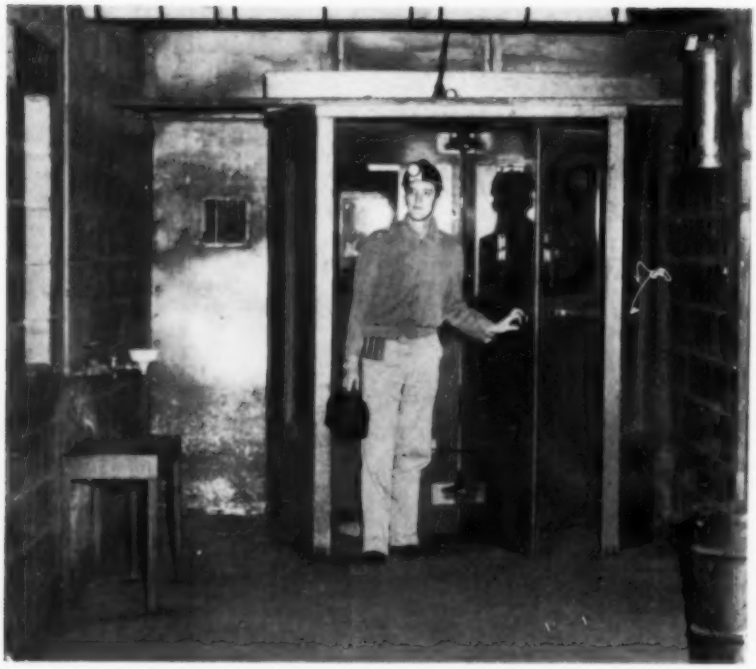
- *Exclusive.* Two counter-spiralled plies of tough special cord floated on resilient rubber for outstanding strength, shear resistance and flexibility.
- Braided cotton breaker ply anchors the tube to carcass *permanently*.
- Tube is high-quality neoprene for maximum hot oil resistance.
- Tough, brown natural rubber cover gives excellent resistance to cuts and abrasion—protects unique construction under extreme service conditions.

U. S. Royal Cord Air Hose has a very high hydrostatic value, with a minimum of contraction or elongation. It is so tough and flexible that it needs no cribbing, can be run over repeatedly by heavy machines without harm. The "hose that's built like a tire" is obtainable in continuous lengths from any of our 27 District Sales Offices, or write Mechanical Goods Division, United States Rubber Company, Rockefeller Center, New York 20, N. Y.

US RUBBER

Mechanical Goods Division

United States Rubber

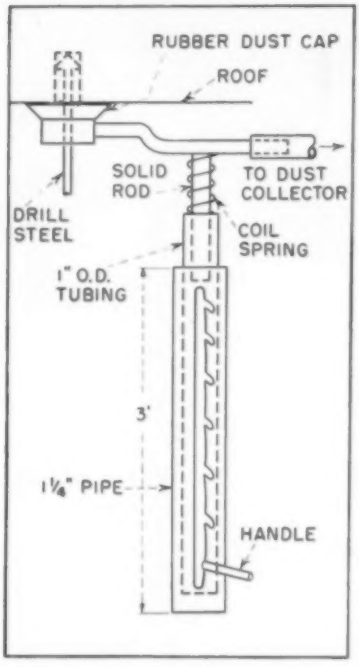


Revolving Door Eliminates Drafts

COLD BLASTS of winter air in the bathhouse are a thing of the past at Freeman Coal Mining's New Orient mine in West Frankfort, Ill. They have been eliminated by installing a revolving door to replace swinging doors at the entrance to the waiting room leading to the mine elevators. Before the revolving door was installed, a total of 8,000 cfm of air was pulled through the building from the elevator shaft.

After the International Steel revolving door was installed, the draft not only was eliminated but the formerly uncomfortable corridor space was made available for making of examiners reports and dispensing miners' cap lamps. The original space where men formerly waited in cold drafts is now used for storage. Men now await the elevators behind the revolving door.

At each shift change 130 men enter the bathhouse locker room, change clothes and go to work at a time as 40 men from the previous shift come up the elevator to shower and change to street clothes.



Jack Supports Dust Collector Cup

A GOOD SEAL between the mine roof and dust collector cap is achieved with an adjustable support built in the shop of the Enoco mine of the Enoco Collieries Co., Bruceville, Ind. A strong spring at the top of the support pushes the dust cap firmly against the roof, preventing dust from leaking out into the air.

A 3-ft length of 1¼-in pipe was used to make the outer housing of the support. A long slot was cut in the pipe and notches cut at 3-in intervals along one side of the slot. The inner section of the support consists of a piece of 1-in tubing fitted with a handle at one end and a short section of smaller rod fitted into the other end. This smaller pipe is welded to the pipe holding the dust collector cup. A 6-in coil spring made from ⅛-in steel fits around the smaller rod extending from the inner section and pushes upward on the collector pipe.

Tips on Hose Care

"A LITTLE CARE saves a lot of wear." That statement is true for any type of equipment used around a coal mine. It is especially true for hoses of all types. Check through the following suggestions for hose care, you may find ways to make your hoses last longer.

STORE PROPERLY

While hose is designed for outdoor service and is resistant to sun checking and cracking, it is best to store it in a cool, shaded place. Therefore don't store hose in direct sunlight, near steam pipes or radiators, or in hot places like boiler rooms.

If hose is hung for long period from a hook or board that puts a strain at one point, cracks and weak spots will be produced. To avoid this trouble, coil hose on a flat surface.

AVOID KINKS

Kinking a soft hose to shut off the flow of liquid may be easier than using a valve but it also is one of the easiest ways to cause a break in the carcass. Bending a hose sharply strains and tears the fabric and later a little extra pressure may cause it to burst at the injured spot.

REDUCE STRAIN AT FITTINGS

Constant strain or flexing at some fittings can easily damage a hose. A common pitfall of this type is pulling hose at right angles to a wall connection. This causes the shank of the fitting to cut the hose and thus shortens hose life.

PREVENT CRUSHING

Wherever hose lines are liable to crushing by vehicle, heavy tools or rocks, they should be protected by planks. Reinforced hose can be bent back to shape after being crushed, but after repeated repairs, the reinforcing wire may crystallize. Thus it is apt to break and puncture the hose.

INSPECT REGULARLY

Regular inspection will prevent most of the costly hose failures that stop production. Fittings should be given special attention to check tightness. Where hose ends have been damaged by clamps or deterioration, they should be cut to a point where a new, solid connection can be made.

NOW you can add or remove cable sections in seconds!

with these NEW O-B cap screw connectors

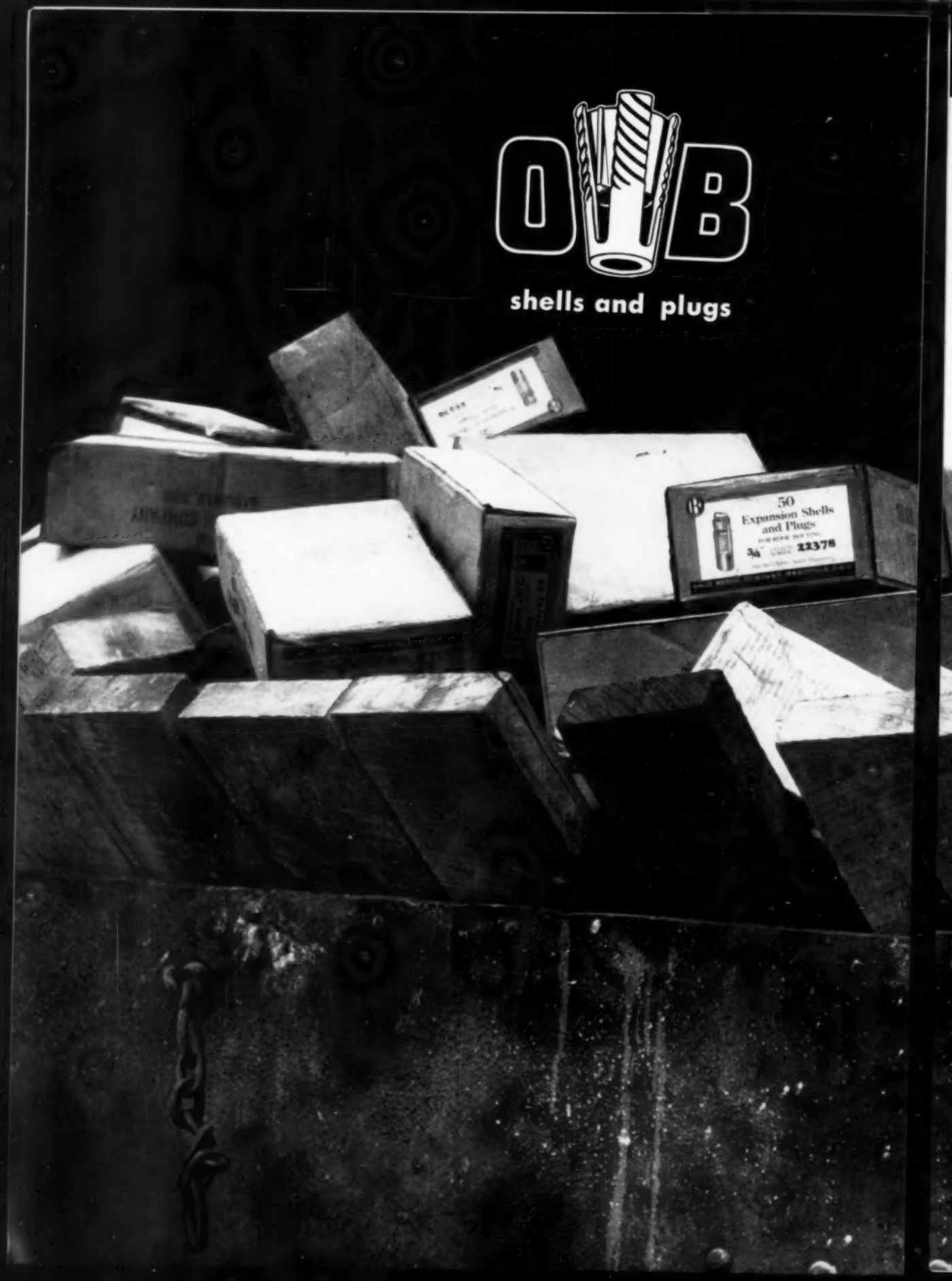
Connect same or different size cables (4/0 to 1,000,000 cm) simply by turning two cap screws • leave connector halves permanently attached to cable for a "built-in" splice that's always ready when you need it • streamlined contours tape easily, drag without snagging • for machine cables and feeder, for switch and panel work • send for complete description in October issue of O-B *Haulage Ways*.

Connector plate available for tapping off primary cables as shown.

Ohio Brass

MANSFIELD OHIO, U.S.A.

Feeder and Trolley Materials • Control Materials • Trolley Shoes
Roof Bolt Shells and Plugs • Rail Bonds • Automatic Couplers

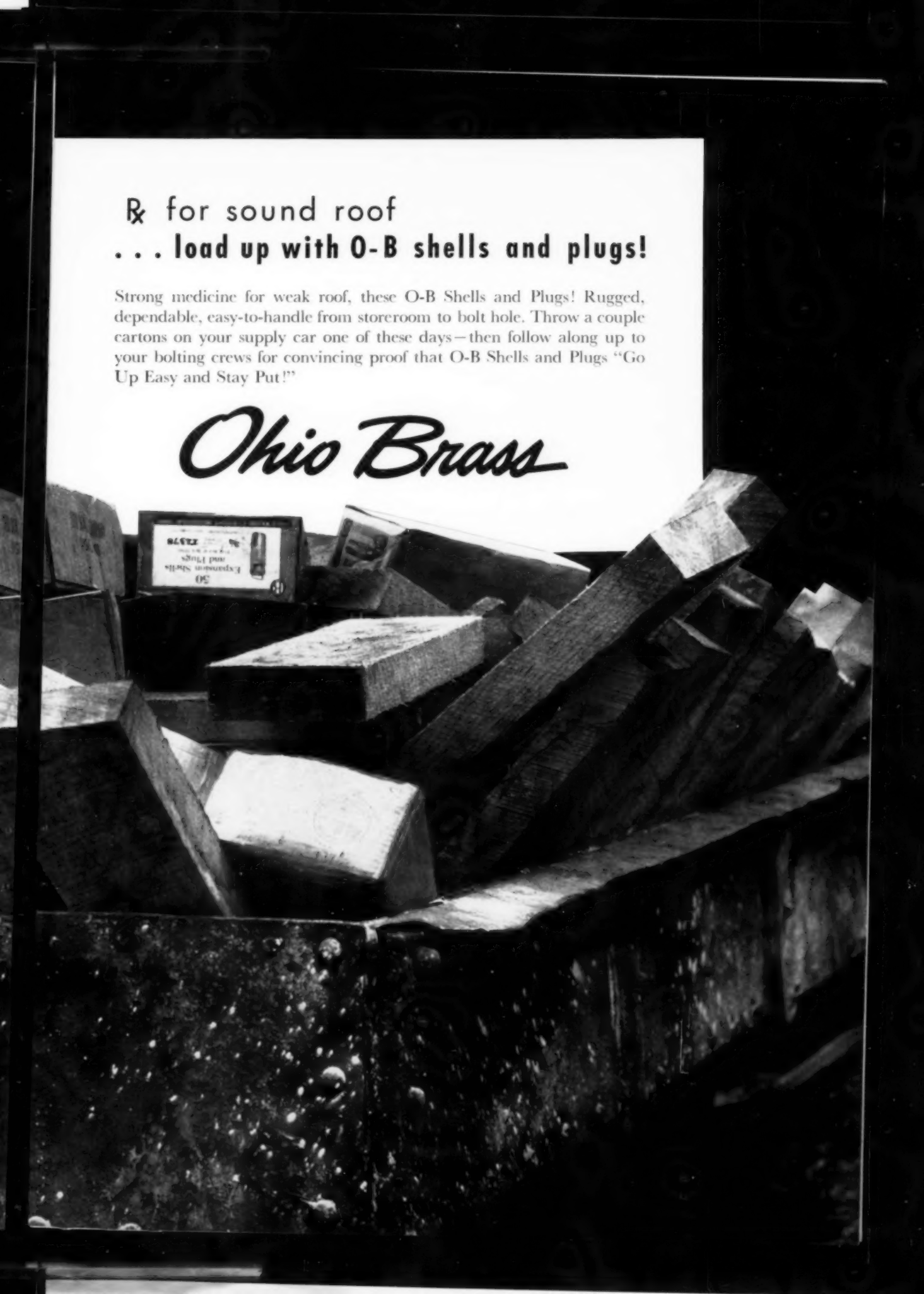

OVB
shells and plugs
50
Expansion Shells
and Plugs
22378

℞ for sound roof

. . . load up with O-B shells and plugs!

Strong medicine for weak roof, these O-B Shells and Plugs! Rugged, dependable, easy-to-handle from storeroom to bolt hole. Throw a couple cartons on your supply car one of these days—then follow along up to your bolting crews for convincing proof that O-B Shells and Plugs "Go Up Easy and Stay Put!"

Ohio Brass



from power tap . . .
. . . to ground return
O-B guards the circuit!

Somewhere between tap and ground clamp, there's a machine at work.

If it gets full uninterrupted power from the mine circuit, with adequate protection from short circuits and extreme overloads, it works efficiently, economically, safely, for a long time.

That's why so many operators rely on O-B to guard their machine circuits. Popular favorites among a wide variety of O-B taps and clamps are the two shown here—the O-B Plier-Type fused tap on the wire, the O-B Set Screw rail clamp on the rail.

Call your O-B representative or write us today for more information on the complete line of O-B fused taps and ground clamps.

4706-M

Ohio Brass

MANSFIELD OHIO, U.S.A.

IN CANADA: CANADIAN OHIO BRASS CO., LTD., NIAGARA FALLS, ONT.

Feeder and Trolley Materials • Control Materials • Trolley Shoes
Roof Bolt Shells and Plugs • Rail Bonds • Automatic Couplers

a NEW screen...for NEW profits

in coal sizing...

Here's New proof you get MORE...MORE VALUE when you specify A-C! Every feature of the new Model "S" screen has been carefully calculated to give you outstanding performance at lowest possible cost...

1. **Added screen cloth life** provided by close spacing of clamping bar bolts and by proper camber of deck.

2. **Rigid side plates** reinforced by vertical angles.

3. **Sturdy screen deck frame** features heavy channels, diagonal braces, replaceable cross members.

4. **No metal-to-metal contact.** Full-length rubber buffer strips cushion screen cloth.

5. **Screen surface easy to install** — Surface slides into place over full-length hook supports. Self-locating clamping bar assembly accommodates screen surface of any thickness.

6. **All parts replaceable.** All bolted construction, using locknuts.

7. **Feed box** (optional) absorbs impact of incoming material. Provides uniform distribution when equipped with flow control gate.

8. **Back plate** (standard) **prevents spillage** — adds structural strength.

9. **Springs prevent whipping and breaking** of screen cloth by maintaining proper tension.

10. **Simplified mechanism** assures maintenance economy.

For complete information, see your A-C representative or write Allis-Chalmers, Industrial Equipment Division, Milwaukee 1, Wisconsin. Ask for Bulletin 07B8229.

ALLIS-CHALMERS

A-4990

Because of its superior resistance to corrosion Mayari R high-strength, low-alloy steel was selected for the mine sets in the shaft of this iron-ore mine in the East.

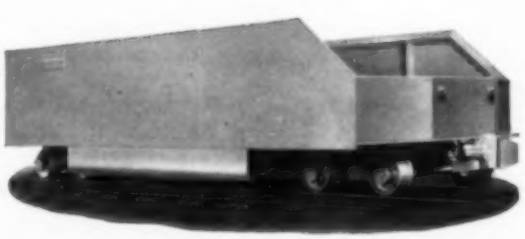
How Mayari R Pays Off in the Mine

Mayari R high-strength, low-alloy steel has a yield point substantially higher than structural carbon steel. This means that a much stronger structure can be built without adding needless weight or bulk; or weight can be reduced without sacrificing a given strength requirement.

Mayari R resists corrosion far better than carbon steel. And it offers greater resistance to abrasion, battering and piercing—an especially valuable feature in the construction of modern, heavy-duty mine cars.

In the shop, Mayari R can be welded just about as readily as carbon steel, with the same general techniques. It can also be flame-cut, machined, formed and otherwise worked in generally the same manner as plain carbon steel. It has good impact qualities and holds paint exceptionally well.

Catalog 353 contains some 66 pages of technical and illustrative material that should be of help to anyone connected with mine construction or operation. You can get a copy through the Bethlehem district sales office nearest you.



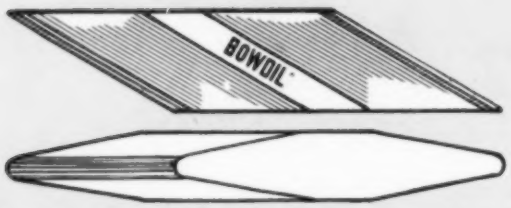
These mine cars, built by Bethlehem, were constructed of Mayari R because of the savings in deadweight made possible by Mayari R's superior strength. Resistance to battering and abrasion also was a factor.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

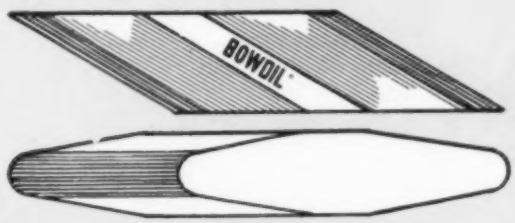
On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. *Export Distributor:* Bethlehem Steel Export Corporation

Mayari R...High-Strength, Corrosion-Resisting Steel

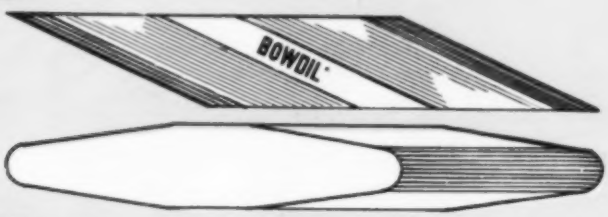
BETHLEHEM STEEL



Series 1-1 **REGULAR DIAMOND BIT, designed for use where cutting conditions are not too severe. Saves power, produces coarse cuttings. 1-1 is MEDIUM Temper, 1-1N1 TOUGH, 1-1N2 HARD.**



Series 1-2 **HEAVY DIAMOND BIT is especially designed for severe cutting conditions (Iron Pyrites and Rock). 1-2 is MEDIUM Temper, 1-2N1 TOUGH, 1-2N2 HARD.**

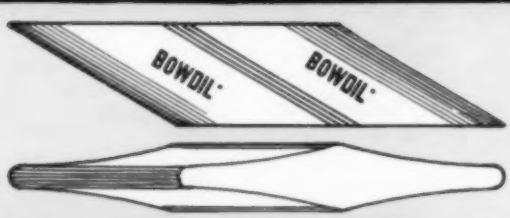


Series 1-6 **LONGWALL BIT is especially designed with a long cutting point for Longwall work. 1-6 is MEDIUM Temper, 1-6N1 TOUGH, 1-6N2 HARD.**

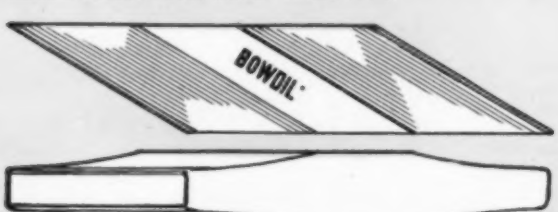
There's a BOWDIL® Bit for every cutting need!

These various types are designed for specific requirements, are made from special alloy steels and are heat treated to three different tempers as listed. Through many years of research on actual conditions in the field, these styles, shapes and hardnesses of Bowdil Bits consistently prove the most popular. We are happy to offer our experience and recommendation for your individual need.

TO HELP YOU RE-ORDER, PLACE YOUR TYPE BIT ON THESE ACTUAL SIZE DRAWINGS



Series 1-11 **REGULAR CONCAVE BIT is designed for the maximum in power savings. Due to the concave shape, side clearance is automatically maintained as the face is worn away, resulting in a more uniform power consumption over the full life of the bit. No. 1-11 is MEDIUM Temper, 1-11N1 TOUGH, 1-11N2 HARD.**



Series 1-29 **HEAVY DUTY CONCAVE BIT has the design features and similar cutting advantages of the Regular Concave, but is made heavier for very severe service. No. 1-29 is MEDIUM Temper, 1-29N1 TOUGH, 1-29N2 HARD.**

ORDER BY NUMBER!

THE BOWDIL CO., CANTON, OHIO

Gentlemen: Rush us

_____ NO. _____ BITS
(Quantity)

Name _____

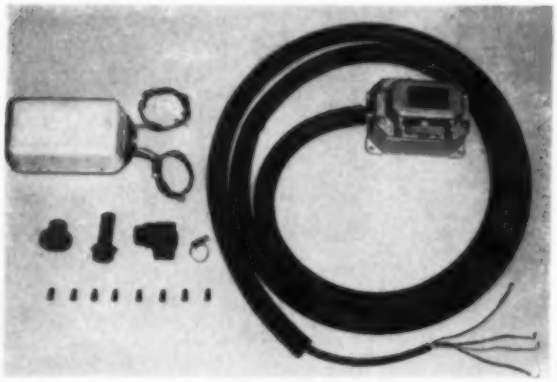
Address _____

City _____ State _____

THE BOWDIL COMPANY

Boylan Ave. S. E. Phone GLendale 6-7176
CANTON, OHIO

EQUIPMENT NEWS

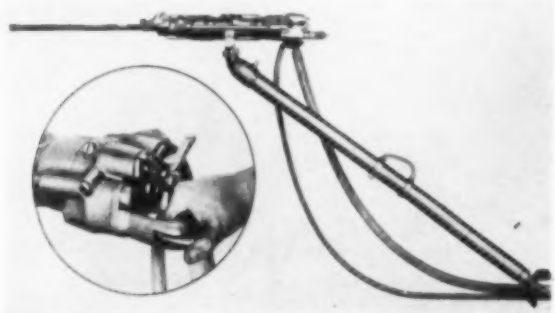


Ground-Fault Detector

Major advantage of the "Protecto" ground-fault detector now offered by the Central Mine Supply Co., Mt. Vernon, Ill., is a design permitting mounting of the relay inside most existing permissible-type controller compartments, with the exception of hand-held machines. In addition to the 5x2x8-in relay housing, the unit includes a pushbutton station designed to be mounted on the machine outside the controller compartment. The station includes "Reset" and "Test" buttons. The circuit, the manufacturer notes, is simple and the component parts are easily replaceable. In operation, the "Protecto" unit is energized when the cable is hooked to the power line and stays energized until it is disconnected. If a frame ground of 40 v or more occurs, the detector de-energizes and locks itself out automatically, preventing operation of the machine until the fault is cleared. Whereupon it automatically resets to restore service. The test circuit permits checking of the operation of the unit at any time. The unit will operate on reversed polarity as well as regular, and can be installed in any position in the controller compartment with the addition of one packing-gland assembly on permissible face equipment.

German Air-Cooled Diesel Engine

Kloeckner-Humboldt-Deutz, AG., Cologne, Germany, has begun selling in United States markets the Deutz air-cooled exhaust turbo-charged diesel engine, according to officials of the Diesel Energy Corp., 82 Beaver St., New York, N. Y., sole importer. Two models of the engine are being made—an eight-cylinder with a rating of 210 hp at 2,300 rpm, and a 12-cylinder rated at 310 hp. Both engines are relatively light, says Diesel Energy. The eight weighs less than 2,000 lbs, the twelve weighs 2,900 lbs. The eight has a bore and stroke of 4.38 x 5½ and a displacement of 649.3 cu in. The twelve has a displacement of 937.9 cu in. The manufacturer recommends the engines for high altitude operation of trucks, construction machinery, pumping sets, diesel electric sets and mining machinery. Deutz claims that its air-cooled system avoids "dangers inherent in water-cooling systems" by eliminating losses through leakage, insufficient cooling resulting from scale, damage through evaporation, sludge deposits, rad ator boiling and shut-down for cooling and refilling. The company also points out that no anti-freeze is needed, and that the air-cooled diesel will warm-up quickly. The entire line can be run on straight diesel oil; low octane gasoline plus motor o'l; or jet fighter fuel.

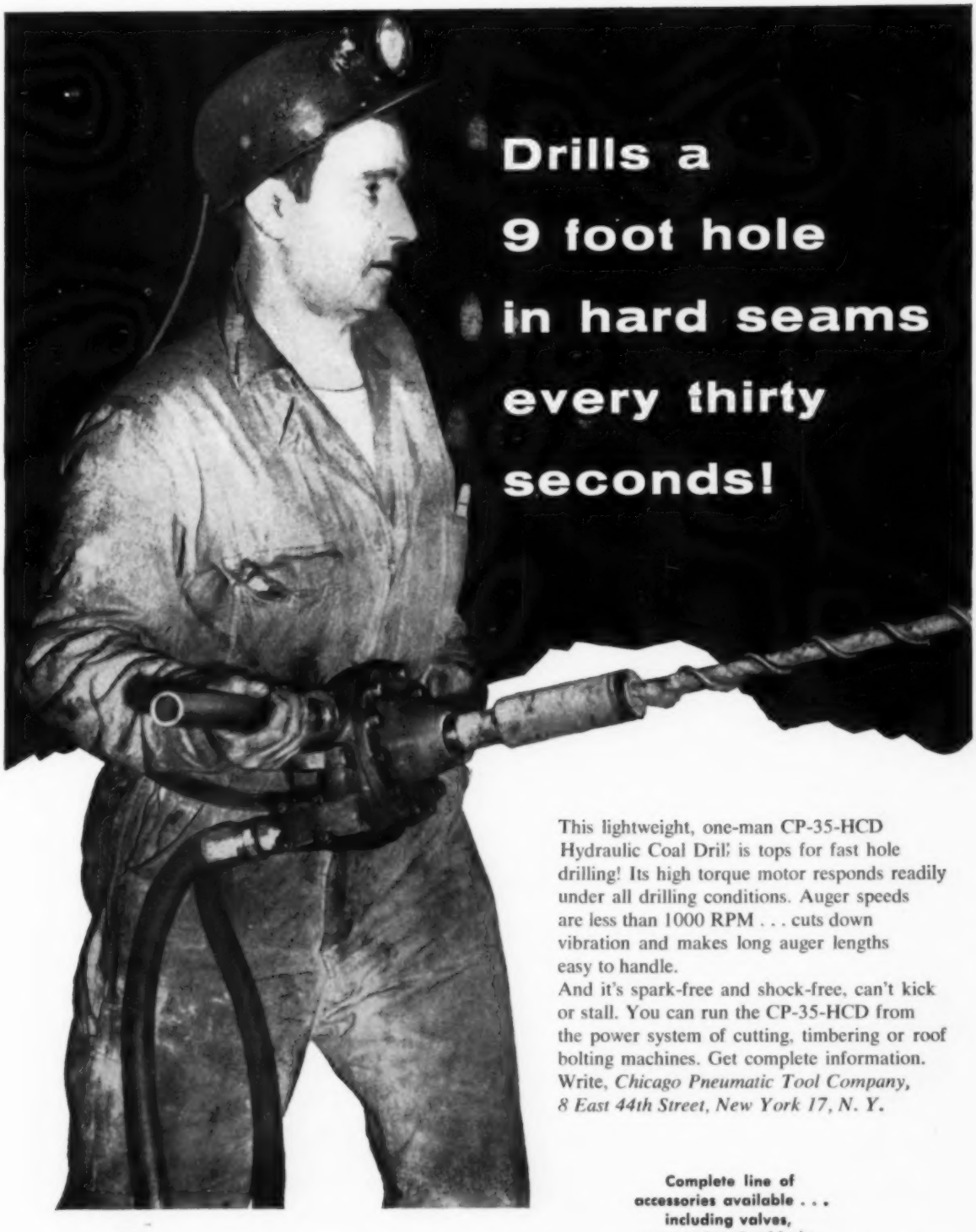


Drill's Leg Retracts Automatically

The development of a high capacity rock drill equipped with an automatically-retracted, semi-integral pusher leg designed for one-hand operation has been disclosed by the Atlas Copco Eastern, Inc., 151 Linwood Ave., Paterson, N. J. Dubbed the "Lion," the drill will gouge to 90 ft at 2 ft per min in granite. Atlas says the drill's capacity is one-third greater than any other machine of comparable weight. Controls for operating the drill and the pneumatic pusher are situated on the back head. Opening the throttle feeds air to the pusher to raise the drill and, at the same time, applies flushing water and starts impact and rotation. Atlas Copco points out that the drill's centralized controls permit miners to make air-powered set-ups and reduce shut-down time during drill steel changes, drill relocation and routine changes. Producing 2,000 blows per min, the 65-lb drill operates at a pressure of 85 psi from a single 1-in air line. Piston bore and stroke are 2¾ in.

Chevrolet Announces '57 Truck Line

The truck above, the Cameo Carrier, is one of the 88 models on 22 wheelbases that Chevrolet Motor Div., General Motors Corp., Detroit 2, Mich., introduced October 19. The entire lineup ranges from pickups and sedan deliveries to tandems capable of performing on or off highway. The larger, heavy-



This lightweight, one-man CP-35-HCD Hydraulic Coal Drill is tops for fast hole drilling! Its high torque motor responds readily under all drilling conditions. Auger speeds are less than 1000 RPM . . . cuts down vibration and makes long auger lengths easy to handle.

And it's spark-free and shock-free, can't kick or stall. You can run the CP-35-HCD from the power system of cutting, timbering or roof bolting machines. Get complete information. Write, *Chicago Pneumatic Tool Company, 8 East 44th Street, New York 17, N. Y.*

Complete line of accessories available . . . including valves, gauges, junction blocks, hoses and fittings

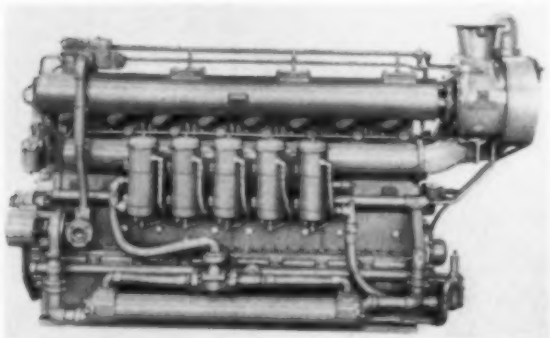
Chicago Pneumatic

PNEUMATIC TOOLS • AIR COMPRESSORS • ELECTRIC TOOLS • DIESEL ENGINES • ROCK DRILLS • HYDRAULIC TOOLS • VACUUM PUMPS • AVIATION ACCESSORIES

duty models are built with a 195-hp Loadmaster V8 engine introduced by Chevrolet last year. Many of the lighter duty models come equipped with a 160-hp V8 engine. Optional on all trucks is a six-speed Powermatic transmission with speed retarder. For lighter trucks the Hydramatic is offered in two sets of gear ratios. Six manual transmissions are also available. New fleetwide safety features include interlocking latches on side doors and steering wheels with hubs recessed 3 in below the rim.

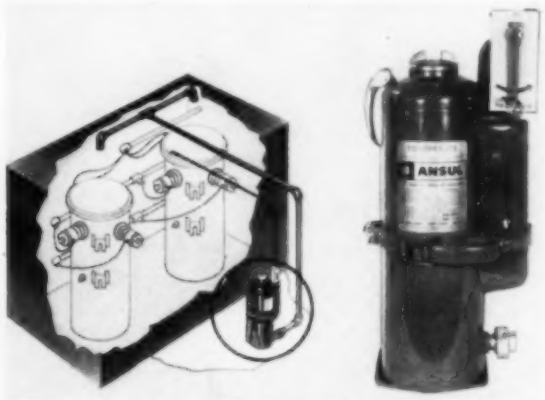
Pocket-Size pH Meter

A pocket-size pH meter to measure acidity and alkalinity is being produced by the Scientific Instruments Div., Beckman Instruments, Inc., 2500 Fullerton Rd., Fullerton, Calif. Designed for easy operation, the instrument is being sold as the "Pocket pH Meter." Battery operated, it can be used in soil research and testing, chemical and industrial research and in testing laboratories. Range of the meter is from 2 to 12 pH. Its single electrode combines both reference and glass electrodes and was developed for specific use with the "Pocket pH Meter." Ordinary flashlight batteries power the unit.



Diesel Operates on Low Cost Fuel

An improved series of industrial diesels capable of operating exclusively on low-cost fuel has been developed in ratings to 1,025 hp by the White Diesel Engine Div., White Motor Co., Springfield, Ohio. The series, named the Model 40 Superior Diesel Engines, are being produced in naturally-aspirated and supercharged models. They are designed for use with heavy equipment, e.g., power shovels, and for use as industrial plant standby power. The engines also are designed for portable generator sets to 600 kw. The White Diesel Engine Div. says the new models are built as four-cycle, six or eight cylinder, vertical, in-line engines, but points out that the units provide power equal to engines with more cylinders. Output ranges from 215 to 1,025 hp, the latter rating representing an increase of 50% over the 700-hp capacity of the previous company line. Yet, says White, the new supercharged engines are the same size as the previous models.



Automatic Fire Extinguisher

A compact, automatic dry chemical fire extinguishing system has been developed by the Ansul Chemical Co., Marinette, Wis., for protection of what the company calls "moderately-sized hazards," e.g., paint spray and dip operations, small transformer vaults, heat treating and oil quench operations, stationary engines. Named the Ansul PS-30, the extinguisher consists of a 30-lb capacity dry chemical unit which is installed near the hazard and serves as a storage tank for the dry chemical. A special CO_2 gas pressure cartridge furnishes pressure to expel the dry chemical through piping connecting the dry chemical unit with the hazard area (photo). The system is capable of providing total flooding or local application, according to Ansul Chemical. It can also be operated either automatically or manually. As an automatic device, the extinguisher's release mechanism is tripped when the heat of a fire causes a fusible metal link situated above the hazard to part. The impulse is transmitted to a release at the dry chemical unit. After a fire has been extinguished the PS-30 can be recharged immediately.

Legal Payload Boosted 2,000 lb

A frameless dump trailer that permits hauling up to 2,000 lb more legal payload than conventional semi-trailers is under construction at the Anthony Co. facilities, Streator, Ill. A redistribution of weight, a simplified lifting mechanism and complete elimination of the conventional trailer frame have been combined to produce the payload advantage, according to Anthony Co. officials. The trailer's body serves as its own frame, its axle as the hoist hinge. The Anthony model RL-6 is 21 ft long with a capacity of 17 yd. Its Teleramic hoist is rated at 25 tons.

B.F.Goodrich

Universal tires still going strong after nine years' service at Illinois mine

MORGAN MINES, INC., operates 14 units at its Williamson County, Illinois, strip mine. Trucks operate year 'round, hauling 30-ton loads of coal over rock and gravel roads. When this mine opened in 1947, Morgan chose B. F. Goodrich tires—and, writes Superintendent Glenn Peugh, "Some of those original tires are still in service with only one retread! The Universal tread pulls better and gives us far less sideslip and skidding."

B. F. Goodrich builds Universal tires with husky, wedge-shaped cleats that grip the ground for positive traction in forward or reverse. Under the specially compounded tread is the B. F. Goodrich *all-nylon* cord body. Nylon is stronger than ordinary cord materials, withstands double the impact and resists heat blowouts and flex breaks. The B.F.Goodrich *all-nylon* cord body outwears even the extra-thick Universal tread, *can still be retreaded over and over.*

Why not follow the lead of Morgan Mines and other leading operators all over the country who have switched to B. F. Goodrich tires. Your nearby B. F. Goodrich retailer will show you the tires that will save you money. Or write *B. F. Goodrich Tire Company, A Division of The B. F. Goodrich Company, Akron 18, Ohio.*

MORGAN TRUCKS line up at mine tipple. 90% of the company's tires are B. F. Goodrich.

MORGAN SUPT. Glenn Peugh (left) says, "We are 100% satisfied with B. F. Goodrich tires."

Specify B. F. Goodrich tires when ordering new equipment

B.F.Goodrich
FIRST IN RUBBER

Your B. F. Goodrich dealer is listed under Tires in the Yellow Pages of your phone book

The DRILL to SEE!

Fletcher
ROOF CONTROL DRILLS

There's one in use near you!

FLETCHER Roof Control Drills are operating in mines from New York to New Mexico, from Alabama to Wyoming, and in most of the states in between.

HUNDREDS of mine operators throughout the country have found FLETCHER Roof Control Drills superior for drilling harder rock and installing more bolts at lower cost.

So there's a good chance that you'll find a nearby mine using FLETCHER Drills. Ask to see them working! Talk with the crew and management! We believe that you will be convinced that a FLETCHER Roof Drill will do your job best and at lowest cost.

- Jack-feed system delivers maximum smooth thrust with quick raise and return.
- Hydraulic lowering device lets you drill directly from the mine floor.
- Hydro-slide moves your drill across the place smoothly, accurately and fast.
- Compact frame and third-wheel steer makes tramming quick and easy.
- Height range from 28 inches to 14 feet lets you select a drill to exactly fit your mine.
- Telescoping mast gives full stroke in varying seam conditions. And the new floor-to-roof mast gives added safety, speed and power.

Find out NOW how you can have these features for YOUR mine. Write now for complete information.

J. H. FLETCHER & CO. P. O. Box 353, HUNTINGTON 8, WEST VIRGINIA Phone 44186

CONTRACT CORE DRILLING

EXPLORATION FOR MINERAL DEPOSITS
INCLUDING URANIUM & LIMESTONE — ANYWHERE

FOUNDATION TEST BORING • GROUT HOLE DRILLING

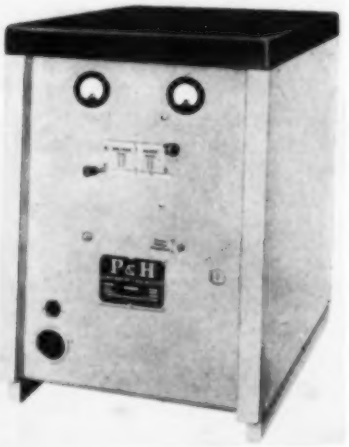
Skilled crews and complete stock of core drills and accessory equipment maintained at all times

Core Drill Contractors for more than 60 years

JOY MANUFACTURING CO.
Contract Core Drill Division
MICHIGAN CITY, INDIANA

Pump Rated at 340 gpm

An air-operated sump pump rated at 340 gpm against a 10-ft head has been placed on the mining market by Le Roi Div., Westinghouse Air Brake Co., Milwaukee 14, Wis. The pump is made in steel or bronze, the latter being recommended for use in acid or corrosive liquids. Capable of operating with a maximum head of 95 ft, the pump's features are: lightweight construction, low air consumption, a governor controlled motor, and a built-in lubrication system. No priming is required. Le Roi says its steel model weighs 56 lb, the bronze model 75.



Constant Voltage Welders

Harnischfeger Corp., Welding Div., Milwaukee 1, Wis., has announced a line of modified constant voltage welders that are said to permit full control in a wide range of applications. The company is constructing machines in 300, 500, 750 and 1,200-amp units. The main feature of the new line is an adjustable slope

TRUE! or FALSE:

A **FAIRMONT**-Built Preparation Plant will improve your sales—increase your profit!

TRUE!

Results prove that coal sales and profits are directly influenced by the quality of the coal.

Good, clean, well-sized coal from a **FAIRMONT**-built Plant sells more readily at a better price . . . while a dirty, poorly graded product goes begging!

Check these facts with your operation . . . are you satisfied . . . or is the lack of a modern and efficient coal cleaning plant losing you sales—cutting your margin of profit?

Pick up the phone now—call us collect—and ask to have one of our trained preparation plant specialists stop by and explain the advantage of a **FAIRMONT**-built cleaning Plant.

Qualified by 60 Years of Experience

FAIRMONT MACHINERY COMPANY

FAIRMONT, WEST VIRGINIA

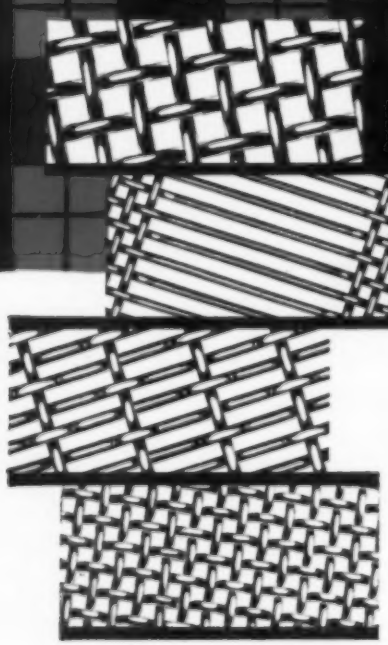
DESIGNERS AND CONSTRUCTORS OF COMPLETE COAL PREPARATION PLANTS USING BOTH WET AND DRY CLEANING, CENTRIFUGAL AND THERMAL DRYING.

Economical!

Ludlow-Saylor

Super-Loy

WOVEN WIRE SCREENS



Because they have been *job proven* to have maximum resistance to wear, L-S Super-Loy Screens keep their accurate openings longer . . . cut down the expense of replacements, downtime, maintenance . . . and reduce your screening costs to absolute minimum. *Most sizes and weaves shipped immediately from stock.*

Write For Condensed Screen Reference Catalog

1856 — 100 YEARS PROGRESS AND SERVICE — 1956

LUDLOW-SAYLOR WIRE CLOTH CO.

609 South Newstead Avenue, St. Louis 10, Missouri

SALES OFFICES: Birmingham—1727 Sixth Ave., North • Chicago—5807 W Diversey • Pittsburgh—Union Trust Building • Houston—1213 Capitol Ave

West Coast: Star Wire Screen & Iron Works, Inc., 2515 San Fernando Rd., Los Angeles; Subsidiary, Ludlow-Saylor Wire Cloth Co.

Treat your coal and your customers with

SOUTHERN HOSPITALITY

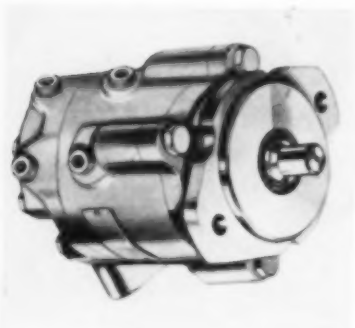
Use "Southland", the *Better* Coal Spray oil that eliminates your spray troubles. Clean, Odorless, Blue Distillate, keeps your spray system clean and your customer contented.

THE SOUTHLAND COMPANY

YAZOO CITY, MISSISSIPPI Telephone • 1212

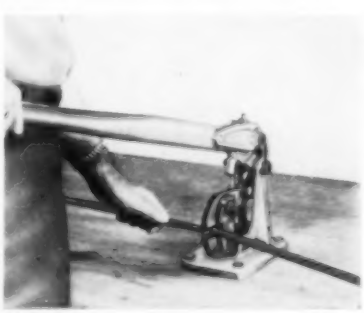
Equipment News (*Continued*)

control that delivers a softer arc, eliminates burn-back and stubbing, and provides a stable, spray-type deposit when properly adjusted for aluminum, stainless steel and other alloys. Other advantages, according to Harnischfeger, are low installation and power costs, and X-ray welds for inert gas, submerged arc, semi-automatic and all-metallic arc automatic welding processes.



Hydraulic Piston Pump

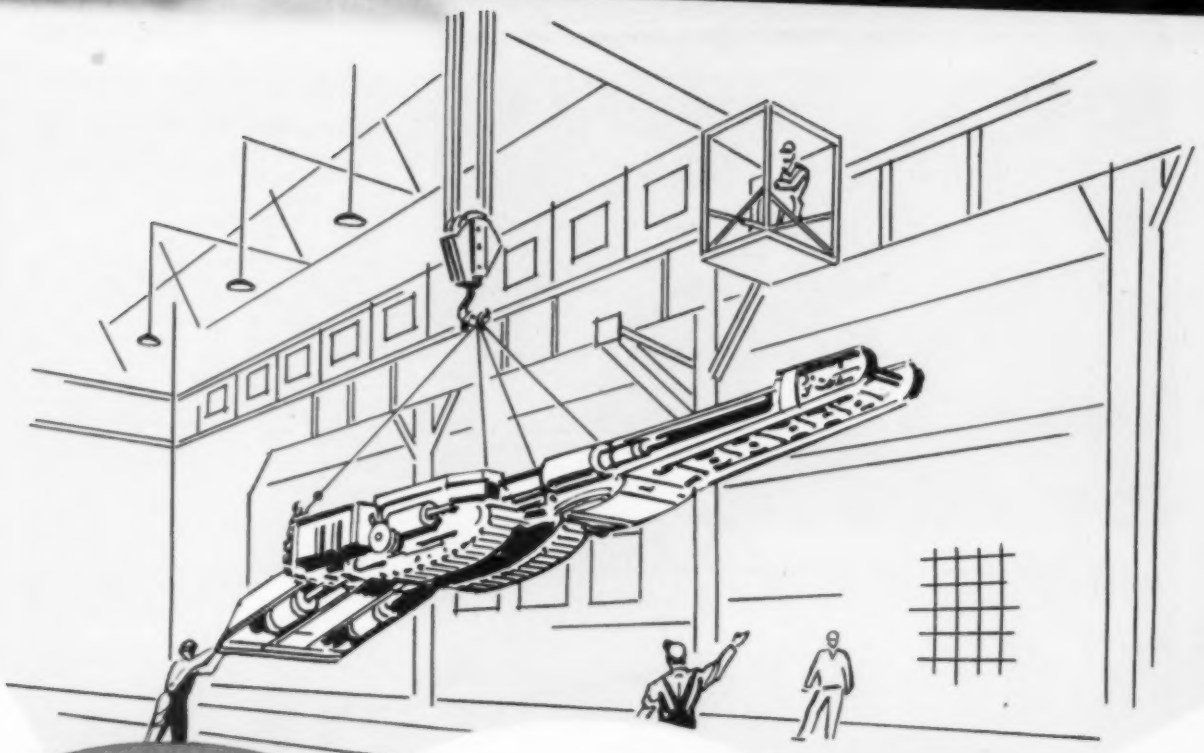
Dynex, Inc., 1500 S. Muskego Ave., Milwaukee, Wis., is manufacturing a hydraulic piston pump in the price range of gear and vane type pumps. Dynex, an offshoot of the Hydraulic Control Div., Blackhawk Mfg. Co., has designated the pump Series PF-3006 and designed it for construction machinery and materials handling devices. The unit is rated at 2,000 psi and has a maximum intermittent pressure of 3,000 psi. Dynex points out that pressures developed by the new piston pump will permit design engineers to reduce the size of oil lines, fittings, valves and cylinders of a complete hydraulic system.



Heavy Duty Metal Cutter

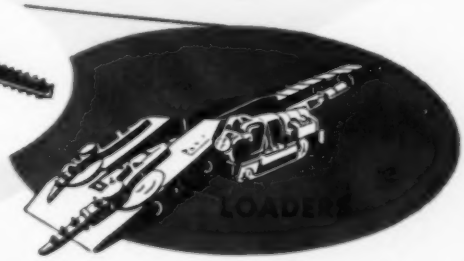
Bolts, wire, rods, chain, bars, strap stock, wire rope, cable, can be cut with the new Porter "Work Station Cutter," according to the manufacturer, H. K. Porter, Inc., 74 Foley St., Somerville 43, Mass. Made in two sizes, No. 1 and No. 3, with a variety of jaws for specific materials, the cutter can be attached to a bench, floor machine, and truck. Metals up to ½ in diameter can be cut, according to the company.

(*Continued on p108*)



SHUTTLE CARS

CUTTERS



LOADERS

FOR REBUILDING—RECONDITIONING, REPAIR

of Complete Units and Sub-Assemblies

National Mine Service Company has the largest, most complete and only plant authorized by JOY in the service field for repairing, reconditioning and rebuilding complete machines or sub-assemblies such as wheel units, control panels, speed reducers, pumps, valves, booms, and other units.

National Mine's facilities—at the Ashland, Kentucky Plant—are centrally located for fast service to all major coal-producing fields. This plant . . . with experienced personnel—modern maintenance equipment—large stocks of genuine Joy replacement parts . . . offers you complete repair or rebuilding—*plus a definite schedule of delivery*!

National Mine Service Company

564 ALCOA BUILDING, PITTSBURGH 19, PA.

See your National Mine Representative for details!

7 Divisions to Serve You

ALL-STATE DIVISION
Logan, W. Va.

ANTHRACITE DIVISION
Forty Fort, Pa.

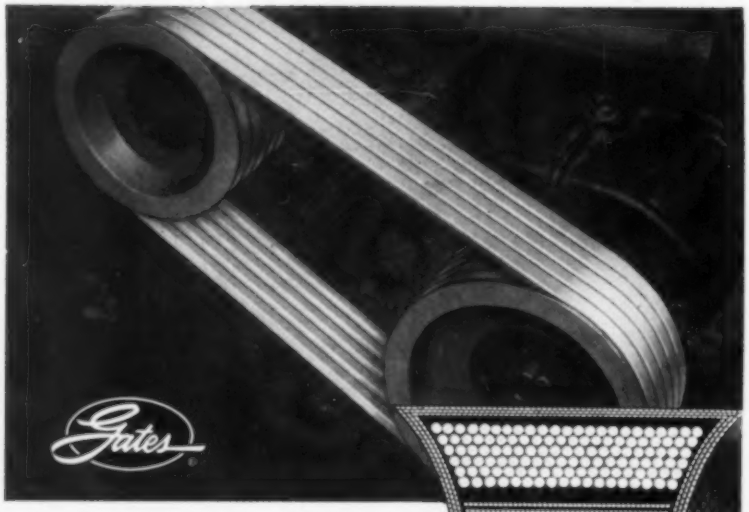
BEMECO DIVISION
Beckley, W. Va.

KY.-VA. DIVISION
Jenkins, Ky.

ASHLAND DIVISION
Ashland, Ky.

WESTERN KY. DIVISION
Madisonville, Ky.

WHITEMAN DIVISION, Indiana, Pa.
and Morgantown, W. Va.



Concave sides make V-belts last longer

The sides of every Gates V-belt (Fig. 1) are concave—a precisely engineered curve that greatly increases V-belt life. Here's why:

On the bend around the sheave, the concave sides of a Gates V-belt fill out and become straight (Fig. 1-A). Thus the belt makes full contact with the sides of the sheave, grips the sheave evenly, and wear is distributed evenly across the sides of the belt. Uniform wear lengthens belt life; keeps costs down.

Make this simple test

Take a straight-sided belt (Fig. 2) and bend it. Feel the sides at the bend; they bulge out. Now picture this bulge in the sheave groove (Fig. 2-A). It is easy to see that the belt makes uneven contact at points indicated by arrows. Naturally, wear is greater at these points. Uneven wear shortens belt life; increases belt costs.

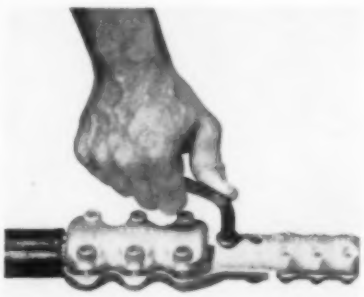
Cut down-time and V-belt replacement costs. Specify belts that grip evenly and wear longer . . . specify Gates Vulco Rope—the V-belt with concave sides. There is a Gates distributor nearby who will quickly supply the belts you need. The Gates Rubber Co., Denver, Colorado —*World's Largest Maker of V-Belts*

TPA 88

Gates VULCO ROPE Drives

Carbon Brushes Proved

Carbon brushes, designed to meet the operating needs of silicone insulated motors and generators, were introduced by the National Carbon Co., division of Union Carbon & Carbide Corp., last year. National Carbon says now that the brushes have been proved in rough service. When ordinary carbon brushes are used in silicone atmosphere, two phenomena occur: (1) rapid brush wear, (2) fluctuating and, often, very high contact drop. The rapid wear is caused by decomposition triggered by silicone vapors in the commutator and brush surfaces. The result is abrasive silica. National Carbon's new brushes, named "National," are known as Grades N-2 and N-6. They are said to operate not only with minimum wear but with more normal contact drop. Both grades are suitable for any type commutating machine with Class H insulation except those in a low voltage class requiring metal-graphite brushes.



Speeds Cable Connecting

Fast, interchangeable cable connections, said to permit removing or adding cable sections in seconds, are being made by the Ohio Brass Co., Mansfield, Ohio. The fast changing speed is achieved by using the company's cap-screw cable connector, a device intended for sectionalizing machine and feeder cables, as well as for switchboard and panelwork. When the connector's halves are clamped to the ends of cable, the connector's tangs are overlapped and locked together with two cap screws. The connector's contours permit cables to be taped and dragged without snagging.

High Temperature Lube

A special purpose, high temperature lubricant has been introduced by the Tower Oil Co., 300 W. Washington St., Chicago 6, Ill. Named "MP Hi-Temperature Lubricant," the product is relatively unaffected by temperature change. No thinning is reported up to 600 deg, at which point it is transformed from a fluid to a gas. As a result, says Tower Oil, there is no build-up of harmful deposits. At lower temperatures (minus 60 deg), the lubricant does not tend to congeal, according to Tower, which recommends it for bearing surfaces sub-

Fights Deposits!

Keep out power-robbing deposits in your heavy duty Diesels. Refill with Sinclair SUPER TENOL® for the tough jobs! It helps to eliminate deposits of carbon, varnish and sludge that impair engine efficiency. SUPER TENOL is specially engineered to fight the effects of high temperature, engine over-load and continuous stop-and-go operation. Your engines last longer!

Refill now with Sinclair SUPER TENOL. Contact your local Sinclair Representative or write Sinclair Refining Company, Technical Service Division, 600 Fifth Avenue, New York 20, N. Y. *There's no obligation.*

SINCLAIR

SUPER TENOL MOTOR OIL

Our Specialization . . . economically protects your investment!

FLOOD CITY MINE PUMP

RENEWAL PARTS AND REPAIRS

● For many years, Flood City has specialized in furnishing standard replacement parts from stock, and in manufacturing replacement parts for all types of centrifugal and plunger type mine pumps. Damage due to wear and acid can be repaired, and many of the features found on Flood City pumps can be incorporated into the pump when it is rebuilt in Flood City shops. Impellers and other parts can be furnished for any make or type, in any desired material.

FLOOD CITY ENGINEERING SERVICE

We will be pleased to have an engineer consult with you on any parts or pump rebuilding job on which you may desire a quotation . . . at no obligation to you.

For complete economical pump repair and replacement service . . . contact FLOOD CITY!

SERVICE FC FIRST

FLOOD CITY BRASS & ELECTRIC CO.

JOHNSTOWN, PA.

Again! STAMLER Replaces Competitive Car Spotters!

We are making an increasing number of sales where the STAMLER reputation for long life and trouble-free service has dictated the change from less satisfactory equipment to STAMLERS!

There is now no question as to the cost-reducing and tonnage-increasing results of Barney Car Spotters nor is there any question of the fact that STAMLERS are best!

STAMLER *Hydraulic* CAR SPOTTERS

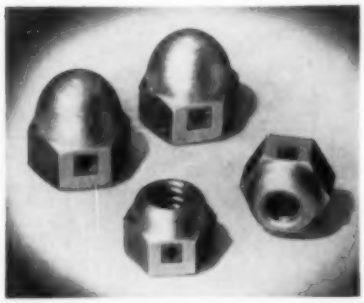
When are YOU going to try a Stamler Car Spotter?

W. R. STAMLER CORP.
PARIS, KENTUCKY

SCHROEDER BROS., Exclusive Eastern Sales Agent
PITTSBURGH, PENNSYLVANIA
UNION INDUSTRIAL CORP., Carlsbad, New Mexico
SALMON & CO., BIRMINGHAM, ALABAMA

Equipment News *(Continued)*

jected to heavy pressures and loads. The company says, too, that the new lubricant is free of chemicals and compounds that might attack metal surfaces and alloys.



Self-Locking Cap Nuts

A line of "thru-tapped" cap nuts has been developed by the Nylok Corp., to complement its line of self-locking cap nuts. The new nuts are used primarily on outdoor and indoor steel and aluminum fixtures. Their "thru-tapped" design helps speed assembly and reduce inventory requirements since washers are unnecessary. Nylok says the nuts can be re-used many times without appreciable reduction in torque.

Pocket-Size Belt Fastener

A tool for applying alligator V-belt fasteners to open end V-belting is being manufactured by the Flexible Steel Lacing Co., 4607 Lexington St., Chicago 44, Ill. Named the "V Fastener," the tool is pocket size, low in cost, and is expected to permit small users of V belts to keep a few feet of open-end belting, plus the tool, on hand to make fast emergency replacements.

Voice Operates Controls

An automatic voice control that eliminates manually operated controls, yet permits private and selective communication, is featured in the "Super Chief Automation Series 7700 Talk-A-Phone" introduced by Talk-A-Phone Co., 1512 S. Pulaski Rd., Chicago, Ill. Traded as "Built-in Automation," the design provides automatic voice control, automatic traffic control, and automatic monitor

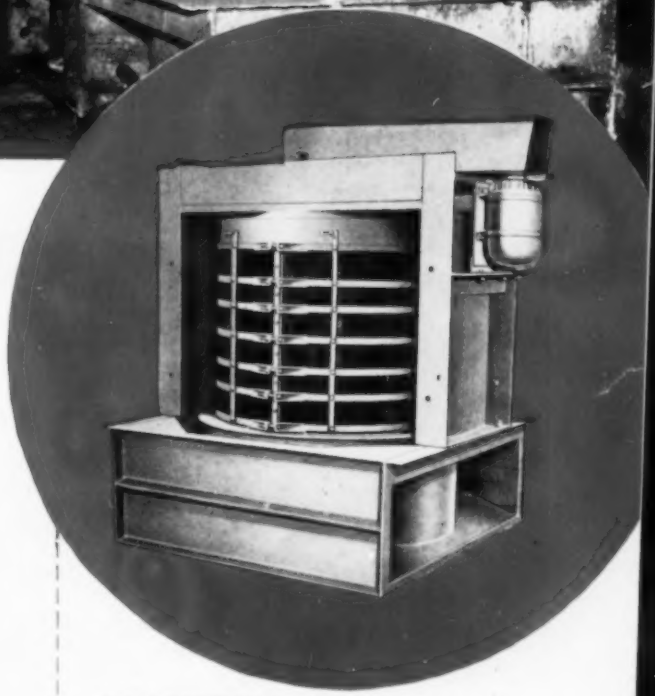
These four Symons V-Screens are installed at Jamison #9 Mine of Consolidation Coal Company (W. Va.) where they are used for dewatering ⅜" x 10 mesh bituminous coal.

SYMONS® V SCREENS

give users maximum efficiency in FINE COAL PREPARATION

The SYMONS V-SCREEN combines centrifugal force with gravity to do a better screening job—make sharper separations—and give you a much dryer product with less degradation than other dewatering methods. It will reduce surface moisture by at least 50%, even on fine coals . . . requires only 5 hp to operate under full load . . . and is the *only* screen that does not depend on gravity alone to size or dewater.

The capacity of the Symons V-Screen is over twice that of a conventional type vibrating screen, per square foot . . . with average tonnages ranging from 35 to 70 tph per screen. In addition, its new screening principle gives extremely long screen cloth life.



FEATURING:

- HIGH CAPACITY
- EXTREMELY ACCURATE SIZING, EVEN IN THE FINER MESHES
- HIGHLY EFFICIENT DEWATERING
- FULLY ENCLOSED — DUSTLESS OPERATION
- EASY REPLACEMENT OF SCREEN CLOTH
- MINIMUM FLOOR SPACE REQUIRED
- LOW COST OPERATION

SEND FOR FREE BULLETIN

Write for your copy of Bulletin 243, which gives the full story on Symons V-Screens.

NORDBERG MFG. CO., Milwaukee, Wisconsin

NORDBERG

MACHINERY FOR PROCESSING ORES and INDUSTRIAL MINERALS

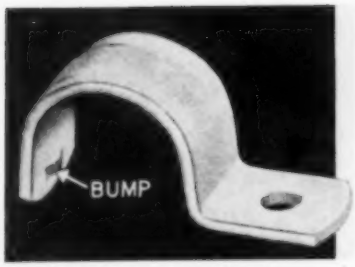
NEW YORK • SAN FRANCISCO • ST. LOUIS • DULUTH • WASHINGTON
TORONTO • MEXICO, D.F. • LONDON • JOHANNESBURG

SYMONS . . . *A REGISTERED NORDBERG TRADEMARK KNOWN THROUGHOUT THE WORLD*

© 1956, Nordberg Mfg. Co.

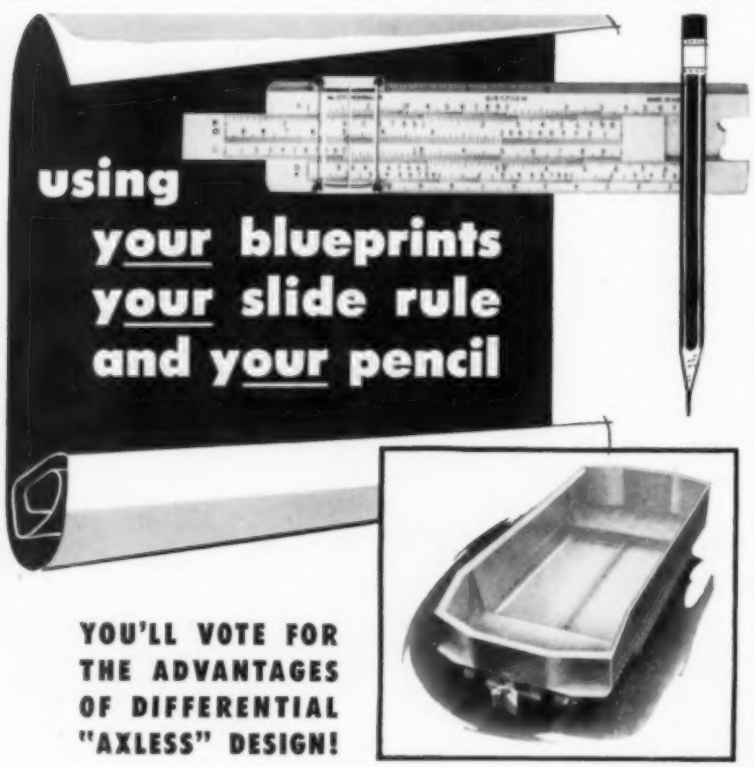
S-356

signaling—as well as closed circuit conferences. Voice alone, says the company, operates the talk-listen control for you.



Metal Straps Hold Pipe

A metal strap to which pipe may be "snapped on" has been announced by Holub Industries, Sycamore, Ill. The company says the strap permits faster installation of pipe, rigid and thinwall conduit, and is particularly useful for overhead work, or hard-to-reach jobs. A raised area inside the snap causes a slight springing action as a pipe or conduit is inserted. The result, says Holub, is rigid support of the pipe or conduit. Constructed of steel and zinc plated, the straps are made in sizes ½ in to 2 in for thinwall conduit, ⅜ in to 2 in for rigid conduit and pipe.



YOU'LL VOTE FOR THE ADVANTAGES OF DIFFERENTIAL "AXLESS" DESIGN!

The greater capacity per pound of empty car weight — the lower investment per ton payload — the lower maintenance and spillage losses — these are impressive figures when you figure the difference with Differentials!

Start your savings **now**! Let one of our mine engineers help you analyze your haulage costs. Absolutely no obligation!

Other Differential Products: Locomotives, Mine Supply Cars, Rock Larries, Mantrip Cars, Rotary Dumpers, Air Dump Cars, and complete haulage systems.

DIFFERENTIAL STEEL CAR COMPANY
FINDLAY, OHIO

SINCE 1915
PIONEERS IN
HAULAGE
EQUIPMENT

Speakers Power Amplified

Motorola is constructing the first mobile communications type speaker containing a built-in transistor amplifier. Named the "Power Voice," the new speaker is said to provide up to 10 times the audio output of standard two-way radio speakers. Voice frequencies are accented, but ignition noise and other interference are suppressed, according to the company. The unit comes equipped with hardware for fire-wall or undermounting. Steering column mounts are optional.

Molded Brake Lining

Flexible molded brake lining material designed for internal and external brake drums is being manufactured by the Raybestos Div., Raybestos-Manhattan, Bridgeport, Conn. The company says the lining material eliminates the need for two types of brake lining. Produced in

NEW! Reynolds Aluminum Mine Service Pipe

Faster, lower cost installations for Temporary Pipe Lines

Now lightweight, corrosion-resistant Reynolds Aluminum Mine Pipe brings new labor-savings and much longer service life to coal mines. Using quick couplings, one man can quickly join pipe sections. And aluminum pipe and couplings easily accommodate coal mine working pressures for drain pipe, air intake, and water intake lines.

Lightweight lowers installation time. Aluminum saves up to 90 percent of the weight of heavy steel pipe.

Quick Couplers Available. Several manufacturers supply high-grade coupling devices to meet mine layout requirements.

Corrosion Resistance Extends Service Life. In one mine with 3.5% sulphur, aluminum pipe is still in service after two years. Standard steel pipe had and average life of less than 3 months.

For further information about Reynolds Aluminum Mine Service Pipe and availability from nearby distributors, write *Reynolds Metals Company, P.O. Box 1800-NQ, Louisville 1, Kentucky.*

Write for new brochure "Reynolds Aluminum Mine Service Pipe".

The Finest Products Made with Aluminum are made with REYNOLDS ALUMINUM

Watch for Reynolds new program, "Circus Boy", Sundays on NBC-TV

How KAISER STEEL Recovers 28 Mesh Coal

...Clarifies Process Water for Reuse...

Closeup view of the 120 ft. dia. Type S Dorr Thickener at Kaiser Steel Co., Sunnyside, Utah.

The fine coal recovery system of Kaiser Steel Company's Coal Preparation Plant at Sunnyside, Utah, consists in part of a large settling tank which makes a 28 mesh separation from a feed of minus 3/16" washed coal and water. Approximately 30% of the settling tank overflow—2500 GPM of water containing 52 TPH of minus 28 mesh solids—is then laundered to the 120 ft. dia. Dorr Thickener. From the Thickener underflow, Kaiser Steel has been obtaining a concentration approaching 40% solids by weight. The overflow from the Thickener is of sufficient clarity that fines entrained in the circulating process water may be closely controlled.

If you have a problem in the recovery of fine coal, Dorr-Oliver engineers can be of help to you. Write Dorr-Oliver Incorporated, Stamford, Connecticut, U.S.A.

DORR-OLIVER
INCORPORATED
WORLD-WIDE RESEARCH • ENGINEERING • EQUIPMENT
STAMFORD • CONNECTICUT • U.S.A.

Equipment News *(Continued)*

25-ft rolls, the material is named "Flex-Molded." The company has constructed the lining by adding brass alloy chips to the material to improve heat transfer and prevent overheating.

Nonlinear Resistor

A Thyrite discharge varistor assembly which represents the first commercial offering of a voltage sensitive nonlinear resistor of its type, has been announced by General Electric's Metallurgical Products Dept., Detroit 32, Mich. The unit is designed for use in protecting motors, generators, magnetic chucks, solenoids, relays and large coils against high inductive surges. Designated Type 9RV6A, the resistors are manufactured in ready mounted groups of 1 to 4 varistors. Each varistor disk is 6 in in diameter, ⅝ in thick and has a 1 in central mounting.

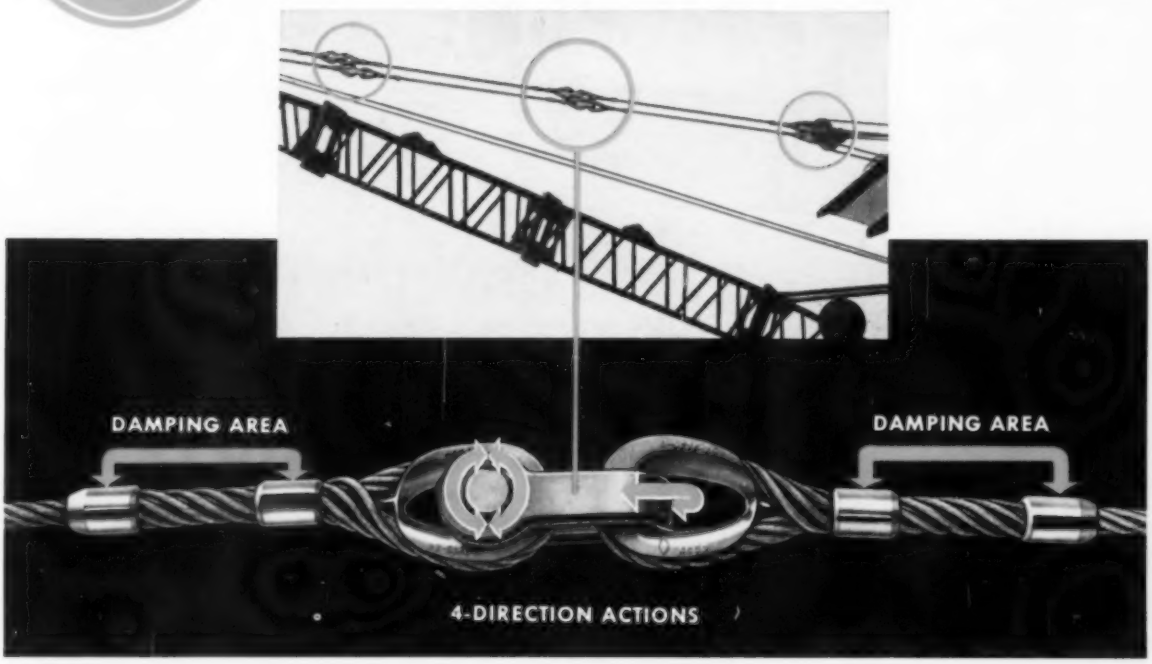
High Efficiency, Dry Filter

A high efficiency dry type, renewable media air filter has been developed by the American Air Filter Co., Inc., Louisville 8, Ky. Named the "Multi-Pak," the filter is recommended in applications requiring higher than normal cleaning efficiencies. Its effectiveness is regulated by a variety of filtering media, from cellulose fiber sheets to dense glass fiber mats.

(Continued on Page 116)

an **ACCO** product

ACCO Registered* Dualoc Boom Cables



Why You Need ACCO Registered Boom Cables on Your Equipment:

...Every Buckled or Dropped Boom Results from Boom Cable Failure

Failure results from either overloading or fatigue. You can avoid overloading, but fatigue occurs every time vibration is stopped suddenly in a wire rope and it is practically impossible to measure how badly the rope is fatigued before failure occurs.

Because vibration in a boom cable occurs in more than one plane, any type of connector which can move in a single plane only, forces the wire rope to stop vibration in all other planes. Therefore, fatigue is set up.

ACCO Registered Boom Cable Connectors give movement in FOUR DIRECTIONS and thus change fatigue to wear, which can be measured easily.

To decrease the amount of this wear and to absorb any vibration which might not be handled by the connectors, ACCO Registered Boom Cables use the damping action of the patented DUALOC ending which absorbs the vibration over a considerable area without dangerously localized fatigue.

ONLY ACCO REGISTERED BOOM CABLES protect your investment through their following Exclusive Features:

1. FOUR-DIRECTIONAL MOVEMENT BY CONNECTORS
2. DUALOC VIBRATION DAMPING
3. WARRANTED STRENGTH
4. CERTIFIED PROOF TEST

*Trade Mark Registered

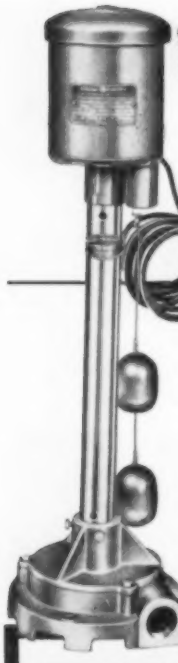
Write today for your copy of **Catalog DH-220** which includes complete information, including dimensions and breaking strengths on the complete line of ACCO-Registered DUALOC Boom Cable assemblies.

ACCO AMERICAN CHAIN & CABLE

Wilkes-Barre, Pennsylvania

Wilkes-Barre, Pa., Atlanta, Chicago, Denver, Houston, Los Angeles, New York, Odessa, Tex., Philadelphia, Pittsburgh, Portland, Ore., San Francisco, Bridgeport, Conn.
In Canada: Dominion Chain Co., Ltd., Niagara Falls, Ont.

Better Value



Handy-Portable . . . **MINE SUMP PUMP**

Bronze and Stainless Steel Construction

Designed for easy handling and installation—at the face—in local dips—wherever water gathers in the mine.

NOTE THESE EMGLO FEATURES:

- Electric—Automatic Operation
- Adjustable Differential Action Sump Control
- Available in 110 and 220 V.AC and 250 V.DC
- All Castings Acid-Resisting Bronze, Non-Fouling Impeller
- 1¼" Discharge

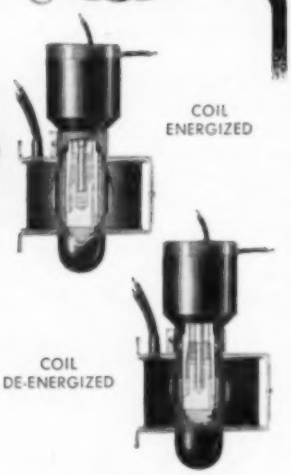
EMGLO *Products*
Div. M. Glosser & Sons, Inc.
80 MESSENGER ST. • JOHNSTOWN, PA.

Sold by Your Mining Equipment Distributor

The **TIMER RELAY that eliminates controlled timing problems**

- ★ No false contacts
- ★ Non sticking
- ★ Practically "fail safe"
- ★ Low cost timer

Durakool
STEEL MERCURY TIMERS



This steel clad, factory set, tamper proof Durakool timer-relay is practically non-breakable. Operating life multiplied 5 to 6 times by new plunger construction features. Any combination of operate-release time delays from 0.15 sec. to 20 sec.—either normally open or normally closed action.

See telephone directory for local distributor, or write.

DURAKOOL, INC.
ELKHART, INDIANA, U.S.A.
700 WESTON RD., TORONTO 9, CANADA

Send for Bulletin 800

Pipe Insulation

Kaytherm, a wide temperature-range molded insulation designed for use on steam and heated process piping has been introduced by Keasbey & Mattison Co., manufacturer of asbestos products. As a low conductivity insulation it will stand pipe temperatures up to 1,350 deg. according to the manufacturer. Produced in half-cylindrical sections 36 in long. Kaytherm is installed with encircling metal bands and can be cut with ordinary tools. Thicknesses range from 1 in to 4 in.

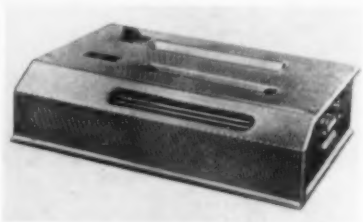


Photo Copy Unit

An automatic photo copy machine named the "Exact-Fax Portable" does all the work of exposing and processing photo copies. The manufacturer, General Photo Products Co., Inc., General Photo Bldg., Chatham, N. J., says the unit will operate under all normal office and factory light, fluorescent or incandescent, and that no shielding device, darkroom or extra equipment is needed. Chemical fumes, washing, fixing and drying are eliminated. The unit will make about 90 copies an hour, 9½ in wide by any length. It will reproduce from all colors at a cost of 4c a copy. Power requirements, 110 v AC. Price, $225.

Equipment Shorts

PRESSURE SEAL—A one piece pressure seal named "Dynaseal" is designed for face-to-face sealing where the bore is open to pressure. Made by B. F. Goodrich Chemical Co., Rose Bldg., Cleveland, Ohio, the seal will protect against pressures up to 10,000 psi, against air, water, oil products, gases and chemicals. The

there's a reason it's not freezin*

1. **FREEZE PROOF**—Coal is easier to sell when it's easier to handle. Permatreated coal resists freezing both in transit and in stock piles. Freeze-proof coal is a customer benefit for industry or home. Take the worry out of winter sales when you sell Permatreated coal—freeze proof, easier to handle.

2. **DUST PROOF — ODORLESS**—Permatreated coal insures dustless deliveries and handling, odorless storage and burning

3. **DECREASE WATER ABSORPTION**—Permatreated coal repels water

4. **REDUCE MOISTURE**—Add 300,000 BTU per ton for each 1% reduction in moisture

5. **AVOID CORROSION**—Non-corrosive Permatreat can't pit or corrode stoker equipment

6. **MAINTAIN QUALITY**—Permatreat reduces deterioration from weathering

7. **ELIMINATE WINDAGE LOSS**—that results in lost weight claims and air pollution complaints

8. **CONTROL BULK DENSITY**—Permatreat insures uniform coke production and quality

* **Coal treated with . . .**

Ashland
PERMATREAT
COAL SPRAY
seals in dust

"lasts the life of the coal"

Interested? Write, wire or phone

ASHLAND OIL & REFINING COMPANY

Ashland, Kentucky

Special Advisory Service available from nationally recognized authorities on coal treatment.

VICTAULIC®

METHOD OF PIPING

VICTAULIC HAS EVERYTHING...

VICTAULIC COUPLINGS
Simple, fast, reliable. *Styles 77, 77-D,* for standard uses with steel or spiral pipe, — *Style 75* for light duty. Other styles for cast iron, plastic and other pipes. Sizes ¾" to 60".

ROUST-A-BOUT COUPLINGS
For plain or beveled end pipe *Style 99.* Simple, quick, and strong. Best engineered and most useful plain end coupling made — takes a real "bull-dog" grip on the pipe. Sizes 2" to 8".

VICTAULIC SNAP-JOINTS
The new, boltless, speed coupling, *Style 78.* Hinged into one assembly for fast piping hook-up or disassembly. Hand locks for savings in time and money. Ideal for portable lines. Sizes 1" to 8".

COUPLINGS FOR EVERY PIPING JOB

VICTAULIC FULL-FLOW FITTINGS
Elbows, Tees, Reducers, Laterals, *a complete line*—fit all Victaulic Couplings. Easily installed — top efficiency. Sizes ¾" to 12".

VIC-GROOVER TOOLS
Time saving, on-the-job grooving tools. Light weight, easy to handle — operate manually or from any power drive. Sizes ¾" to 8".

PLUS FITTINGS AND GROOVING TOOLS

"EASIEST WAY TO MAKE ENDS MEET"

Promptly available from distributor stocks coast to coast.
Write for NEW Victaulic Catalog-Manual No. 55-A-11.

VICTAULIC COMPANY OF AMERICA
P. O. BOX 509 • Elizabeth, N. J.

Equipment News *(Continued)*

maker says Dynaseal is effective from minus 55 deg to 250 deg.

OIL-TYPE CLUTCHES, BRAKES—Caterpillar Tractor Co., Peoria, Ill., has begun installing oil-type steering clutches and brakes on all its D-8 tractors.

SHELVING—The Frick-Gallagher Mfg. Co., Wellston, Ohio, is manufacturing "Quick-Bilt" shelving that is assembled, arranged and rearranged to meet storage requirements by the user, who selects as many shelves and dividers as he needs, snaps them into place himself.

SILICONE PROTECTED SHOES—"Sylflex," a silicone used with shoe leather permits a person to walk through water and acid solutions without getting his feet wet. The material, however, does not block the leather's pores, and thus cannot make the feet hot and uncomfortable, according to Dow Corning, Midland, Mich., the maker.

POWER TOOLS—Black & Decker Mfg. Co,. Towson, Md., has announced the No. 10 adjustable and positive clutch "Scrugun" for driving screws from No. 8 to No. 18 sizes. In addition the company has announced a new impact wrench (weight 7 lb) that delivers 1,800 high intensity impacts a minute. B&D says the wrench cannot be stalled or overloaded and reaches maximum torque in 6 sec.

IDENTIFICATION — Two improved property control systems, Clearview Co., 172 Stanton St., New York 2, N. Y., is marketing a stamping machine for producing identification plates and tags. Dubbed the "Mainplate Press" the unit provides special coated numbers for permanent plates for attachment to property and equipment.

FIRE EXTINGUISHER—A 2½ gal fire extinguisher for use on Class A fires (wood, paper, rags) is being sold by the Ansul Chemical Co., Maronette, Wis. A stored pressure water extinguisher, the unit has a range of 35 to 40 ft. It is recharged by refilling with water and pressurizing to 100 psi from any compressed air source.

Free Bulletins

DIESELS—"Detroit Diesel Turbopower," a General Motors publication, contains information on diesels from 159 to 300 brake hp. Includes design and performance data. Detroit Diesel Engine Div., General Motors Corp., Detroit 28, Mich.

FRICTION MATERIALS—Johns Manville asbestos brake blocks, linings and clutch facings are described in "Industrial Friction Materials," form FM-35-A, a publication of Johns Manville, 22 East 40th St., New York 16, N. Y. Information includes facts on molded asbestos,

PYROPRENE* BELTING FIRE RESISTANT

*Acceptance designation: "FIRE RESISTANT, U.S.B.M. No. 28-7" January 27, 1956

FIRE RESISTANT • OIL RESISTANT • MILDEW PROOF

Want more details? Have a special belting problem? Hamilton's 86 years of experience will help you!

OVER 86 YEARS OF SERVICE TO INDUSTRY

HAMILTON RUBBER MANUFACTURING CORPORATION

Executive Offices and Factories . . . Trenton 3, New Jersey

Branches in

ATLANTA • CHICAGO • CLEVELAND • HOUSTON • PITTSBURGH
INDIANAPOLIS • LOS ANGELES • NEW YORK • SAN FRANCISCO

Equipment News *(Continued)*

woven materials and assembled sets for servicing popular industrial machines.

SWAGED ASSEMBLIES—Macwhyte Co., Kenosha, Wis., is offering catalog 5601 as an information guide to the company's line of swaged assemblies of wire rope and fittings. The assemblies are made with a length of preformed wire rope with a different terminal attached to one or both ends. Each end is designed to receive various terminal fittings.

CHAIN SLINGS, FITTINGS—A 42-p catalog (ADV-719) is being distributed by the Bolt & Chain Div., Republic Steel, Cleveland 27, Ohio, to explain the terminology of chain slings and to assist buyers in specifying requirements. Included is a section on proper use and care of slings.

OFF-HIGHWAY HAULING—The 24-ton (model 95) and the 18-ton (model 65) Payhaulers of International Harvester Co., are the subjects of booklet CR-495-F, a publication being distributed from the company's Construction Equipment Div., 180 N. Michigan Ave., Chicago 1, Ill. Also available is booklet CR-521-F, a four-pager describing the company's Drott TD-14, 4-in-1 Skid-Shovel. Both booklets are illustrated.

TUBING—Catalog 4305, published by the Tube & Hose Fittings Div., The Parker Appliance Co., 17325 Euclid Ave., Cleveland 12, Ohio, contains charts and tables to aid in selecting tube size, wall thickness and material for various operating conditions. Flow requirements, pressures, severity of service and temperature are given consideration.

DC MOTORS—Direct-current motors, ½ to 200 hp, and motor-generator sets to 200-kw output are described in bulletin 53B8424 by the Allis-Chalmers Mfg. Co., 968 70th St., Milwaukee, Wis. Included are shunt and stabilized shunt wound, compound wound and series wound motors, plus a matching line of motor-generator sets for conversion of AC to DC.

CONVEYOR PULLEYS—Barry conveyor pulleys for original installation or replacement are described in bulletin CP-80 by the R. & J. Dick Co., Inc., Dept. P, 1 Sade St., Passaic, N. J. Barry type "QD, H, and L" solid steel conveyor pulleys, lagged pulleys and type "S" split steel pulleys are featured.

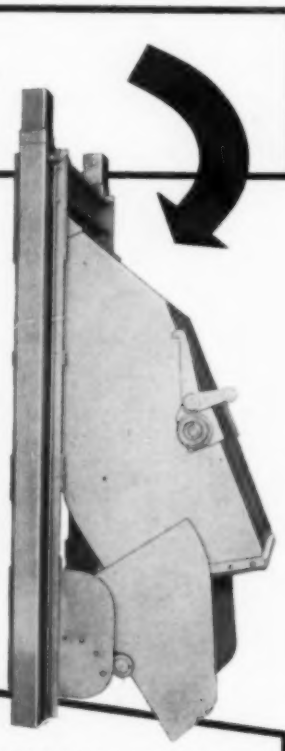
WIRE ROPE—"Quality Unlimited," a sound-color film describing the manufacturing of wire rope, is being made available by the Wickwire Spencer Steel Div., The Colorado Fuel & Iron Corp., 575 Madison Ave., New York 22, N. Y. The film follows all operations of wire rope production.

LUBRICANT TESTER—The Alpha Molykote Corp., 65 Harvard Ave., Stamford, Conn., will send on request Bulletin 106, a pamphlet describing the model LFW-1, a machine designed to test bonded coatings and liquid lubricants. A stationary rectangular block is pressed against a rotating Timken R ring. Friction then indicates test results. Temperature, however, may be substituted for friction.

VERTICAL TURBINE PUMPS—Layne & Bowler, Inc., Memphis 8, Tenn., will provide "The Answers to Your Questions About Layne Vertical Turbine Pumps" on request (company letterhead only). The 72-p bound book includes such topics as "Centrifugal Pumps Designed for Underground Waters," "Turbine Pumps as Used for Well Equipment," "Column Life of Deep Well Pumps," and "Vertical Short-Coupled Turbine Pumps." All text is supplemented with graphs, tables, photographs, drawings and charts. The company says the information has been compiled to present an all-inclusive reference book on vertical turbine pumps.

WATER FILTERS—AWF Filters for Complete Automation is the title of bulletin 909 being offered by the R. P. Adams Co., 225 East Park Drive, Buffalo 17, N. Y. Dimensions, charts, flow curves

From Connellsville, *naturally!*



WET or DRY— LARGE or SMALL

It's never a problem when you are using this

QUICK-DUMPING BOTTOM DISCHARGE SKIP

A Skip that's of uniform size from end to end . . . no obstructions for material to hang up on.

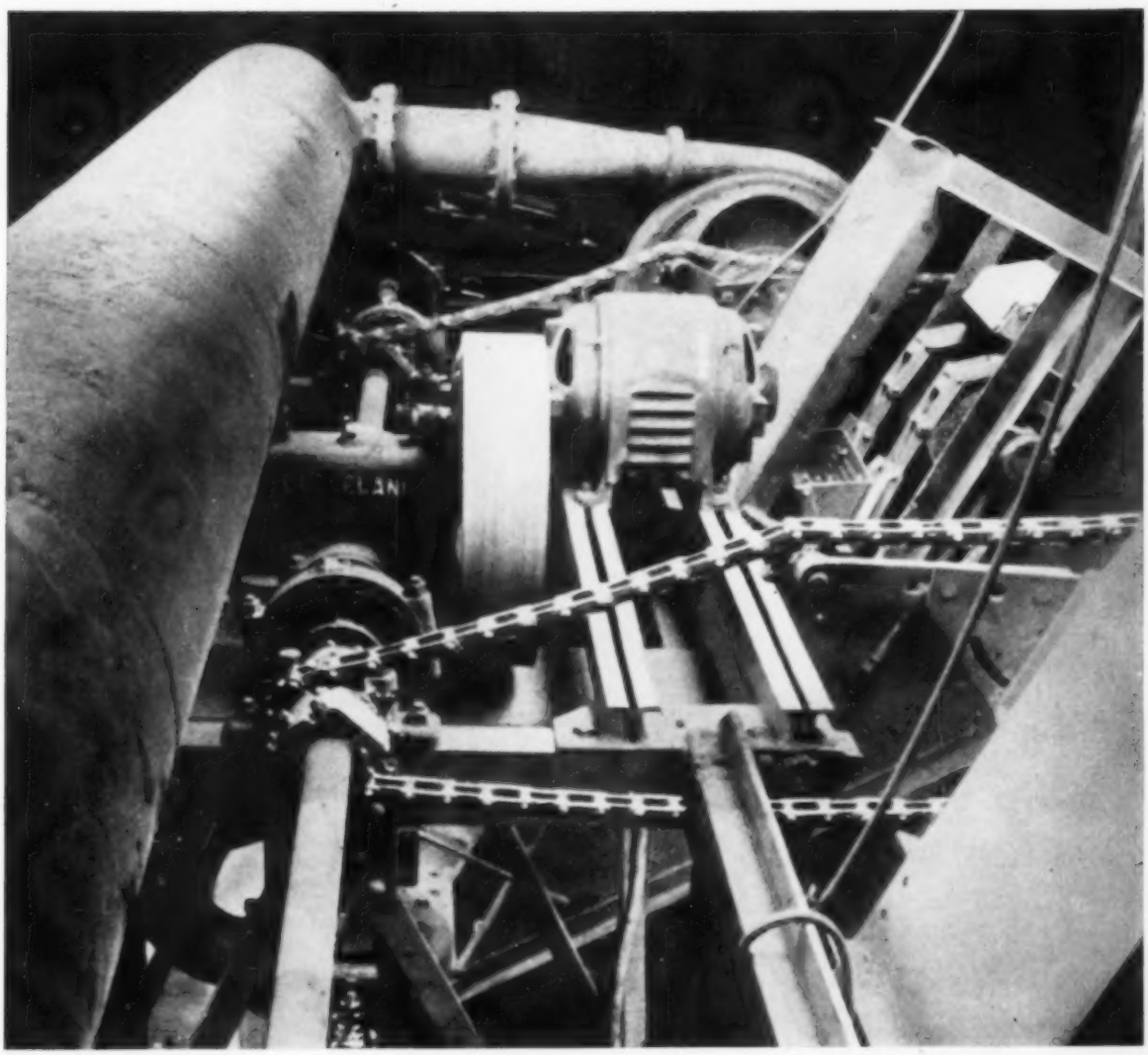
BY THE LEADER in bottom discharge skips this new skip is designed to handle all types of underground raw material. The top loading end being the same size as the bottom discharge end, there are no obstructions for wet, sticky and/or unusually large material to hang up and clog. This unique feature allows a speedier discharge cycle with very little vertical travel needed for dumping.

The skip bottom is ruggedly constructed to withstand the loading impact and a rubber seal stops all leakage.

Made in capacities from 4 to 12 tons, live load. For detailed information write—

CONNELLSVILLE
MANUFACTURING & MINE SUPPLY CO.
CONNELLSVILLE, PENNSYLVANIA

"Serving the Mining Industry Since 1901"



For lubrication that does a better job . . .

"GET THE AMOCO MAN OVER"

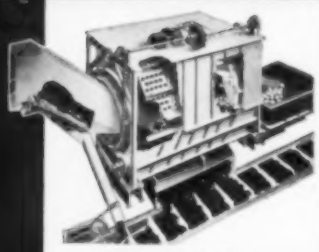
The Amoco man's lubrication know-how can give you real help in cutting coal mining lubrication and upkeep costs, with less "down-for-repairs" time lost on expensive coal mining machinery. His services are free. Call him over without obligation. *American Oil Company, New York*

AMOCO
LUBRICANTS

AMOCO®

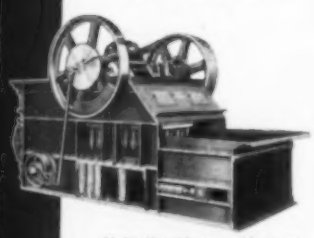
Sure . . . safe . . . for mine machinery

America's most complete line of CRUSHING EQUIPMENT



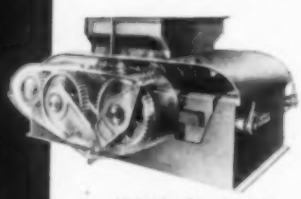
McNally Pittsburg Rotary Breaker

This unit allows positive control of top size in handling run-of-mine washery feed. Production of fines is held to a minimum.



McNally Norton Vertical Pick Breaker

50% Less fines when reducing lump to egg and stove sizes.

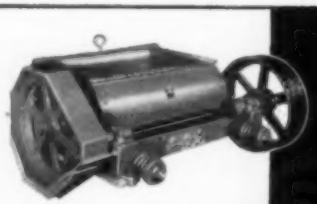


McNally Double Roll Gearmatic ROM Breaker

Built in tonnage ranges from 750 tph to 1400 tph. Full floating gearmatic drive.

McNally Gearmatic Stoker Coal Crusher

This unit offers three prime advantages: high volume production, plus accurate sizing, plus low percentage of fines.



McNally Single Roll Crusher

Universal application 20", 24" and 36" diameter rolls.

AVAILABLE

From Stock and on Short Delivery

For immediate action on complete information write, wire, or call.

McNALLY PITTSBURG MFG. CORP.

Pittsburg, Kansas Wellston, Ohio

Equipment News *(Continued)*

are given for three sizes of AWF filters and for Poro-Stone, Poro-Screen and Poro-Edge elements. Typical installations are shown.

SPEED REDUCERS—Booklet B-6727, "Speed Reducer Engineering Manual," presents application information (e.g., horsepower, torque capacity, overhung load values) on speed reducers driven by electric motors, gas, oil or diesels. Westinghouse Electric Corp., Box 2099, Pittsburgh 30, Pa.

TIME CONTROLS—Paragon Electric Co., time controls manufacturer, is distributing a 20-p booklet as a reference to multi-purpose and industrial time controls. The booklet can be used as an up-to-date check list of Paragon time switches and timers. Catalog 5700, Paragon Electric Co., Two Rivers, Wis.

SLURRY PUMPS—Features, applications, sizes and capacities of the Oliver diaphragm slurry pump are contained in bulletin 5003. The pump is designed to operate with no leakage to 100 lb. Dorr-Oliver Inc., Barry Place, Stamford, Conn.

BUTTERFLY VALVES—A 40-p hard cover catalog designed to help engineers select valve types, understand valve characteristics and determine space needs is being distributed by the Henry Pratt Co., 2222 S. Halsted St., Chicago 8, Ill. Pressure drop, flow and conversion tables are included.

PNEUMATIC CONTROLLER—A 56-p bulletin describing the Series 500W pneumatic controller is available from The Bristol Co., Waterbury, Conn. Bulletin A130 features: control band width of ½ to 400%; high sensitivity of controller without loss of stability.

BLASTING FILM—Stripping operators faced with a public relations problem because of blasting near populated areas may be interested in a film named "We're Blasting Near You." The film describes precautions that blasters take to prevent accidents and to protect private property. Explosives Development Section, Atlas Powder Co., Wilmington 99, Del. Atlas recommends showing the film to various civic groups as an educational feature.

FLOCCULATING AGENT—"Separan 2610 in the Coal Industry" is a technical manual describing specific uses of Separan 2610 as a high speed flocculating agent. Dow Chemical Co., Midland, Mich., is the publisher. The booklet covers the properties of Separan 2610, the preparation of its solutions and their uses in coal washing operations.

HORIZONTAL, ROTARY FILTER—Dorr-Oliver, Inc., Stamford, Conn., will send on request bulletin 7201, which describes the "Oliver Horizontal Rotary Filter." The filter is designed for continuous dewatering and countercurrent washing of granularized solids with free filtering characteristics. The bulletin includes design, operation, sizes and capacities.

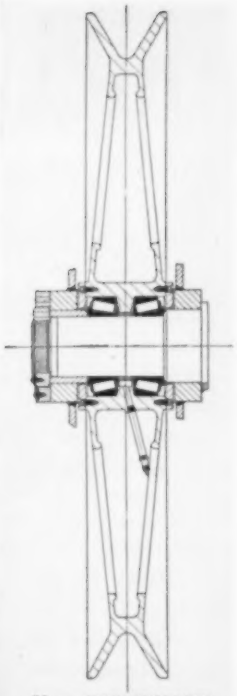
GEAR MOTORS—Bulletin GEA-6133A, 8 pp in two colors, illustrates gear-motor features and includes selection data, dimensions, ratings and specifications of fractional-horsepower gear-motors. Available from General Electric Co., Schenectady 5, N. Y.

SYNCHRONOUS-INDUCTION MOTORS—"Synduction" motor, for industrial applications requiring 40 hp or less, is described in a new bulletin released by Allis-Chalmers Mfg. Co., Milwaukee 1, Wis. The unit combines synchronous speed with induction simplicity, and each is engineered for a particular application. Ask for Bulletin 51B8440A.

POWER LUBRICATION—Details on most recent developments in power-lubrication systems are featured in Catalog 811 offered by Lincoln Engineering Co., 5729 Natural Bridge Ave., St. Louis 20, Mo. Book covers description and functions of manual and automatic systems, diagrammatic illustrations and ordering information.

BELT DATA—Complete data on conveyor elevator and transmission belting is included in a new 32-p catalog offered by Boston Woven Hose & Rubber Co., P. O. Box 1071, Boston 3, Mass. Reference tables and specifications provide working guide for engineers and purchasing agents. The company's balanced belt construction, which insures even tension throughout various plies also is explained.

FLEXIBLE-CHAIN COUPLINGS—New revision of 16-hp Morse flexible-chain coupling catalog gives specifications, dimensions, ratings and applications for Series DSC, SA and DRC chain couplings. Available from Morse Chain Co., Industrial Sales Div., Ithaca, N. Y.



How **THE MARION POWER SHOVEL COMPANY** mounts sheaves on Timken bearings . . . to take radial, thrust loads in all combinations, keep heavy-duty sheaves in positive alignment.

World's largest shovel scoops 90 tons, lifts it 10 stories moves it 290 feet on 34 TIMKEN® bearings

BUILT by the Marion Power Shovel Company, this gigantic "coal miner" moves many tons of overburden per hour for the Hanna Coal Company. With 10 motors controlling the digging cycle of the 90-ton capacity dipper—an additional 4 motors for its 8 powerful cat treads—built-in elevator—auxiliary crane for hoisting equipment aboard—this tremendous earth mover is 100 times larger than the ordinary construction shovel.

34 Timken® tapered roller bearings carry terrific radial and thrust loads in all combinations, at critical points—including swing machinery and all hoist sheaves. Full line contact between rollers and races gives extra load-carrying capacity. And because Timken bearings have case-carburized rollers and races—shock-resistant cores under hard, wear-resistant surfaces—they take heavy shock loads. Designed to roll true, precision manufactured to live up to their design, Timken bearings practically eliminate friction, reduce wear on integral parts. Closures are more effective, too, because Timken bearings keep housings and shafts concentric, keeping lubricant in, dirt, dust, water out.

When you buy or build machinery, look for the "TIMKEN" trade-mark on every bearing. The Timken Roller Bearing Company, Canton 6, Ohio. Canadian plant: St. Thomas, Ontario. Cable address: "TIMROSCO".

This symbol on a product means its bearings are the best.

TIMKEN

TRADE-MARK REG. U. S. PAT. OFF.

TAPERED ROLLER BEARINGS ROLL THE LOAD

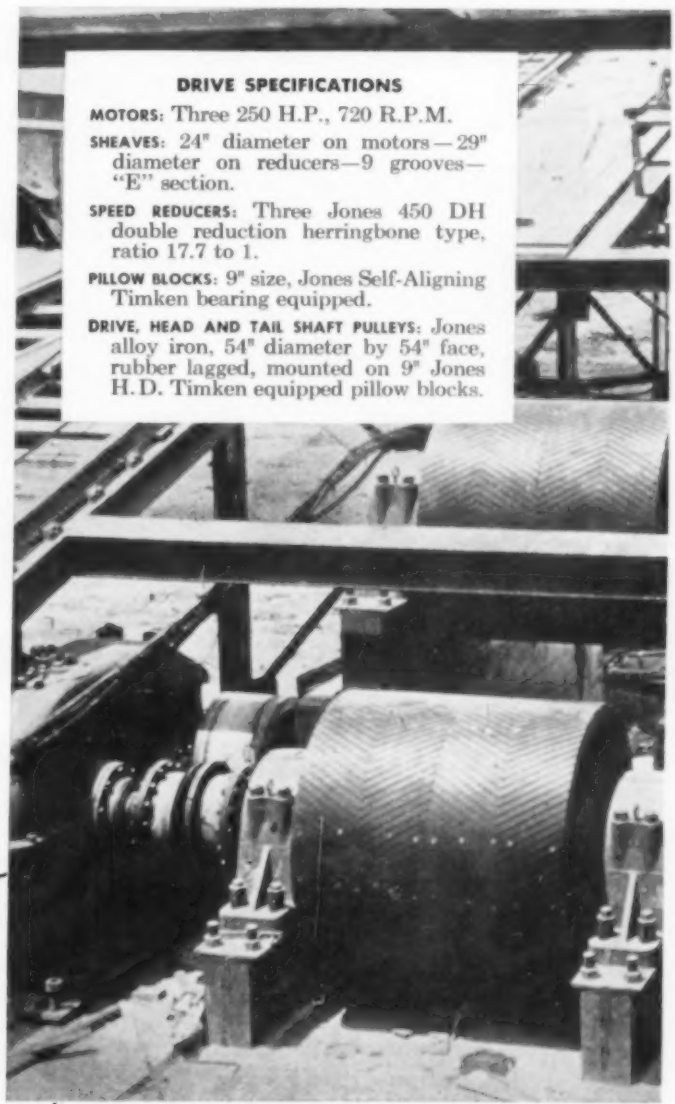
TRIPLE-DRIVE BELT CONVEYOR

Continuous-Operation "Insurance" for

Power breakdowns can't interrupt production at this large Illinois coal mine. Continuous operation is assured because the main slope conveyor is driven through three Jones Speed Reducers in a dual-tandem and single arrangement. Designed to handle 1,200 tons per hour, the conveyor is 1,729' on centers at an incline of 16° with a total lift of 475'.

Other advantages of multiple motor drives are: easier handling of smaller equipment during original installation or overhaul . . . lower cost and greater availability of spare parts, because motor, coupling and speed reducer parts increase in cost and decrease in availability proportionate to the size of the drive.

Such special-purpose combinations of standard drive equipment to meet specific industrial requirements have long been the particular province of the Jones Machinery Division of Hewitt-Robins. Suiting the equipment to the need requires not only a broad background of engineering experience, but also a wide range of versatile, reliable power transmission products. Jones Machinery Division offers both the techniques and the equipment. For information about Jones products, write to Hewitt-Robins Incorporated, Stamford, Connecticut.



DRIVE SPECIFICATIONS

MOTORS: Three 250 H.P., 720 R.P.M.

SHEAVES: 24" diameter on motors—29" diameter on reducers—9 grooves—"E" section.

SPEED REDUCERS: Three Jones 450 DH double reduction herringbone type, ratio 17.7 to 1.

PILLOW BLOCKS: 9" size, Jones Self-Aligning Timken bearing equipped.

DRIVE, HEAD AND TAIL SHAFT PULLEYS: Jones alloy iron, 54" diameter by 54" face, rubber lagged, mounted on 9" Jones H.D. Timken equipped pillow blocks.

INDUSTRIAL DIVISIONS PRODUCTS

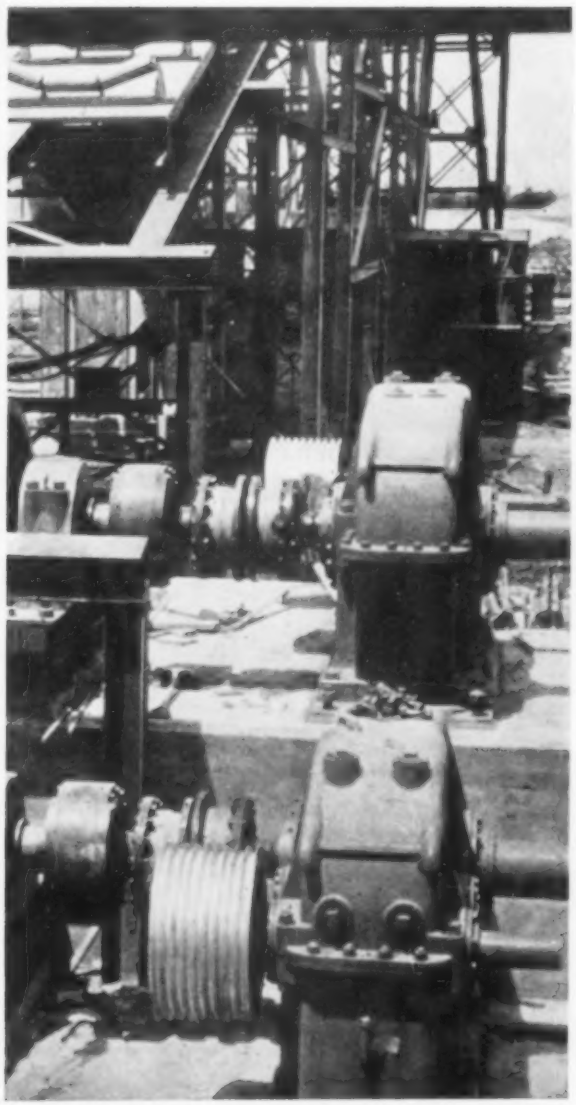
INDUSTRIAL HOSE • VIBRATING CONVEYORS
CONVEYOR BELTING • CONVEYOR MACHINERY
VIBRATING SCREENS • DESIGN, MANUFACTURE, ENGINEERING AND ERECTION OF
COMPLETE BULK MATERIALS HANDLING SYSTEMS
"GLIDE RIDE" THE NEW MOVING SIDEWALK
"JONES" POWER TRANSMISSION EQUIPMENT

HR HEWITT

STAMFORD,

SYSTEM

Illinois Coal Mine



-ROBINS

CONNECTICUT

HEWITT-ROBINS VIBRATING EQUIPMENT FOR THE COAL MINING INDUSTRY

GYREX SCREENS. General-purpose, positive-stroke, 4-bearing screen with amazing versatility of application and an unsurpassed record for stamina in service.

STYLES M AND MS VIBREX SCREENS. Full-floating, unbalanced, pulley-type, 2-bearing screen. Offers sharp sizing of a wide variety of materials at low cost.

STYLE J VIBREX SCREENS. General-purpose screen applicable to a wide variety of screening operations. Wide range of sizes for suspended mounting.

HI-G SCREENS. Revolutionary new "modified resonance" principle permits larger screens and bigger capacities at less power. Unusually sharp screening action. Can be made in sizes larger than any other vibrating screen on the market.

ELIPTEX SCREENS. Exclusive 3-way elliptical motion for sharpest sizing and most effective dewatering. Horizontal-operating flat screens.

CAR SHAKEOUTS. Both Heavy-Duty and General-Service units for unloading all sorts of materials from hopper cars faster, more efficiently and more economically.

VIBRATING FEEDERS. Fully mechanical vibrating feeder. Easy to install, operate and maintain. Extremely high capacities at very low power consumption.

SCREEN CLOTH. Wire cloth in a variety of sizes, weaves and materials for virtually every sizing, separating or screening operation.

FOR SERVICE AND INFORMATION ON BELTING AND HOSE CALL YOUR LOCAL HEWITT-ROBINS INDUSTRIAL SUPPLY DISTRIBUTOR LISTED IN THE "YELLOW PAGES"

NEWS ROUND-UP

First ACS Libertys Ready This Month

A flotilla of six Liberty ships, the first of a fleet of 30 turned over to American Coal Shipping, Inc., by the United States Maritime Commission, will be ready to ply the Atlantic by Nov. 15 and Dec. 1. The remaining ships are expected to be ready for sea duty by February or March, 1957. William Conant Brewer, ACS president, says that the Libertys will emerge from their mothball protection at a rate hampered only by congested shipyards. The 30 ships will be operated directly by ACS as a result of the Maritime Administration's decision last month to grant the coal-rails-UMWA triumvirate a shipping charter. The charter's conditions, as spelled out by the board came by and large as ACS had requested. The terms were considerably more liberal than those recommended previously by a Maritime examiner.

Briefly, these are the rules laid down for use of the government ships:

- ACS is limited to hauling coal outbound, and bulk ores such as manganese, bauxite, and iron ores in-bound—unless Maritime approves movements of other cargo.
- The charter's length is indefinite, but subject to cancellation by either ACS or the government on 15 days' notice. But, if ACS cancels within the first year, it must pay the full charter rate of approximately $127,000 per ship per year, or 15% of statutory sales price of each ship.
- The government will bear the initial cost of putting the ships into service. Breakout costs are estimated to run around $4.5 million for the 30 ships. But the cost will be included in the charter rate and ACS will receive a reduced rate after the ships have been fitted for service and costs have been met.
- In about 6 mo the Maritime Administration will review the progress made toward new ship construction by ACS, then determine whether the government charters should be continued. Although no firm commitments were required of ACS to build new ships, use of government ships was given as a stop-gap measure until ACS could acquire its own fleet. Maritime, therefore, intends to make periodic checks on construction progress.

The approval of the ACS charter request has opened the door for other shipping companies to get government ships for hauling coal. In its approval the Maritime board indicated that it would give "favorable consideration" to other applications for government ships to be used to haul coal on the same conditions granted to American Coal Shipping, Inc.

In New York last month ACS president Brewer said that the company had not yet made a formal request for 50 more ships (*Coal Age*, Oct. 1956, p 134). Whether the formal request will be made, and when it will be made, will depend on how acute the need for coal ships becomes in the months ahead. ACS is closely watching the Suez crisis, the reported cessation of Polish coal exports and other factors likely to step up Europe's needs for U. S. coal.

Mr. Brewer would not disclose the target range for a basic coal freight rate (Norfolk to Rotterdam), which ACS hopes to achieve in the operation of its ships. ACS, he said, will compete in the open market for coal shipments and would charge the "going rate." But he indicated that if the rate should become unreasonable, ACS might have to take corrective action. Just what is a reasonable or an unreasonable rate was difficult to say, Mr. Brewer added. The present rate of $10 and $10.50 between Norfolk and Rotterdam did not seem "unreasonable."

He said that although the Maritime decision permits the company to bring return bulk cargoes from overseas, most ACS ships would probably return empty in the interest of fast turnarounds and because return ore shipments were not expected to be particularly profitable.

Regarding a future program, Mr. Brewer said that plans for building new ships are in the preliminary stage. Ships under consideration will probably range in capacity from 17,000 to 20,000 tons. Such ships will take about 3 yr to build—their probable cost was not disclosed. When and if these ships are built and put under ACS operation, their principal advantages will be bigger capacity and possibly somewhat lower rates. All ships would be built in the U. S. and no overseas ship building is being considered, although ACS is doing some preliminary investigation on setting up bulk cargo terminals at strategic ports overseas such as Rotterdam. At present ACS owns one Liberty, recently bought for $775,000.

President Brewer gave assurance that his company was permanently in the coal shipping business and for as long as the need lasted. At the present time, there are no signs of abatement of this need. ACS, he added, was not out to pirate trade from independent U. S. shipping interests. The basic aim is to maintain a "reasonable" rate for coal shipments overseas and to insure against "unreasonable" rates that might develop if demand for U. S. coal overseas keeps climbing to expected heights in the years ahead.

Mr. Brewer said he did not think there was any basis for claims that the USMC had given ACS preferential treatment in approving its request to charter 30 Libertys. He drew attention to the fact that the USMC, in rendering its decision, commented that any other industry "equally well qualified" could also obtain ships from the Federal government.

Meanwhile, coal-hungry western Europe is buying U. S. coal at a record rate. The Organization for European Economic Cooperation (OEEC) estimates this year's imports of U. S. coal at 42 million tons against last year's 25 million. France alone, normally a small importer, has bought 422,000 tons thus far. That's 10 times as much as the French bought from the United States during a corresponding period last year. In West Germany, the steel-making company August Thyssen-Huette A. G. made a quick deal for a Greek freighter, quickly painted the name "August Thyssen" on its prow, and prepared the ship for service between Germany and Hampton Roads, Va. The company hopes to cut both costs and delivery delays.

Here in the United States optimism over a big, new market soared to even newer heights. At the Virginia World Trade Conference, Walter J. Tuohy, president of the Chesapeake & Ohio, said that coal exports of 100 million tons a year now seem "reachable."

In This Section

Preparation Facilities	130
News Briefs	132
Meetings	132
Bituminous, Anthracite Tonnages	134
Equipment Approvals	137
MEMMA Meeting	140
Foreign News	148
Personal Notes	154
Among the Manufacturers	158
Books for Coal Men	162

Price Rises Follow Raise To UMWA Miners

In Cincinnati, Ohio, early last month a mellowing John L. Lewis rumbled contentedly to his audience of United Mine Workers. There was good reason for the contentment. The night before, the UMWA leader had signed a new wage pact (*Coal Age*, Oct., 1956, p 134), with the Bituminous Coal Operators Assn., and there was no reason why the Southern Producers Assn. led by Joseph E. Moody should not agree to the same terms of $2 a day and other

TAKES BIG BITES FASTER

—*costs less than other Diesels*

GM DETROIT DIESEL
CASE HISTORY No. 563-210

OWNER: James E. Hoffman, Karthaus, Pennsylvania.

INSTALLATION: GM Detroit Diesel Series 110 "Twin" replaced 4-cycle Diesel in Lima 2400 4½-yard shovel used in strip mining.

PERFORMANCE: "Doing a very good job," says the owner. This machine's production has been noticeably increased. Fuel consumption averages 12 gallons per hour. GM engine starts easier in cold weather. Costs less to install than other Diesels of comparable horsepower.

"We're very well satisfied," says this first-time General Motors Diesel owner of a "Twin 110" unit used to repower his 4½-yard shovel. "It's doing a very good job."

The "110" is the *economical* engine for heavy work. And the newest model of this outstanding performer is even better than ever—with the new style blower for better scavenging, quieter operation, higher efficiency.

This new Detroit Diesel Series 110 is more compact—can easily be installed in big off-highway trucks, tractors, scrapers and excavators. It's ready to step up production and cut costs on any job you name. Ask your local GM Detroit Diesel Distributor or Dealer for full details.

Single Engines . . . 50 to 500 H. P. Multiple Units . . . Up to 895 H. P.

America's Largest Builder of Diesel Engines

JIMMY DIESEL'S MAINTENANCE TIPS

Is your GM Detroit Diesel ready for winter? Your GM Detroit Diesel Distributor or Dealer can get it ready with a check of the cooling system and an engine tune-up. He will also help you set up a preventive maintenance program to keep your Diesels running right, winter *and* summer. Why not give him a call today? And remember—Preventive Maintenance Doesn't Cost—It Pays.

DETROIT DIESEL

GM DIESEL POWER

Engine Division of General Motors
Detroit 28, Michigan

benefits. (As early as Oct. 5 southern operators also had accepted.) The new contract would keep miners, paywise, ahead of autos, steel and rubber, and this was the way Mr. Lewis wanted it. Miners, "must be paid the most," he said, offering "those who deny that fact" a chance "to mine a little coal."

The smoothly wrought pay raise, an example of the coal industry's excellent relations today with the UMWA, set off a round of price raises that could not be avoided. Appalachian Coals, Inc., in Cincinnati, said "It will be necessary to increase the price of all ACI coal in all sizes and grades into all markets a minimum of 35c a ton at once in order to return to the producer the increased cost of mining bituminous coal." The rise is in addition to regular seasonal price restoration. ACI, in fact, also announced that "as of April 1 prices will need to rise again to cover the additional wage increases scheduled for that date." The miners' raise gives them $1.20 a day now, 80c more in April.

Among the southern producers the reaction was similar. Southern producers said that an analysis of the new contract indicated it would result in an increased cost of approximately 56½c a ton.

Mr. Lewis had said: "this contract encompasses all that the industry is able to pay at this time. There isn't any more." Mutely, the industry agreed.

Industry negotiator Edward G. Fox, when buttonholed by reporters asking how the wage agreement would affect the price of coal, would say only that "the resulting increase per ton of coal will vary with the productivity rate of each individual mine." Mr. Lewis' comment was: "I haven't any doubt that the price increase on coal will be much less than the $8.50 per ton increase on steel."

The UMWA convention, where the labor pact signing took place (photo), was in effect a victory celebration for Mr. Lewis and the UMWA. But it was not the kind of victory celebration held after an opponent has been squashed. Rather, it was the celebration marking the unity of two onetime foes, united perhaps permanently. "For six years now there have been no major stoppages in the industry," Mr. Lewis said, "and for an indefinite period into the future that will continue, providing the leaders of the industry on both sides continue to exercise that discretion and judgment which they possess." (Mr. Fox nailed down future estimates of peace by saying the contract guarantees more than 7½ yr without a major coal strike.)

Again pointing to peace in the industry, Mr. Lewis said: "I think it is a tribute to the present leadership of the Bituminous Coal Operators Assn. that they are willing to assume the responsibility of amending the existing contracts without the firing of a shot."

On the responsibility of the miner, he had this to say: "The UMWA cannot undertake to negotiate wage contracts . . . unless we can offer reasonable evidence that we intend to observe that contract. Those of our members who have with impunity been violating this contract in increasing numbers will have to find that out the hard way if they will not abide by the constitution and by the agreement. I cannot speak too strongly of the seriousness of this problem. Between Jan. 1, 1956 and May 5, 1956, . . . 170 local strikes of major magnitude had taken place in the various districts."

John L. Lewis at 76 is still the sharp-speaking phrase handler of the past. Off-the-cuff asides at the convention provided reporters with a bagful of Lewisisms and union philosophy. On the United Auto Workers and, without naming him, Walter Reuther; he said: "Anybody who does not think the UMWA is a democratic institution and who thinks it deprives them of their inherent and native-born rights ought to go over to the United Auto Workers. They would get all the democracy they want over there. I don't know whether they could keep up with the reading or not. A new pamphlet would be issued to them every day. They would be told how to settle the situation in Persia, Cambodia, Viet Nam or Goa—but not much on how to get the wages UMWA is going to get."

At another time he cited August figures showing that auto workers get $4.10 a day less than miners; steelworkers $2.72 a day less, and rubber workers $2.56 a day less.

ASME-AIME Conference Gives PN Award to Reed

Presentation of the Percy Nicholls Award to C. A. Reed, director, Engineering Dept., NCA, featured the ASME-AIME Joint Solid Fuels Conference banquet held Oct. 25 at the Sheraton Park Hotel, Washington, D. C. The award, presented by J. B. Morrow, a former recipient of the honor, recognizes Mr. Reed's outstanding achievements in the

CONGRATULATORY CLASP between John L. Lewis, United Mine Workers, and Edward G. Fox, Bituminous Coal Operators Association, followed signing of new wage pact at UMWA convention. Thomas Kennedy (second from left) was chief UMWA negotiator.

Developed by Maumee Collieries Co., Terre Haute, Ind.—Akremite offers high energy at extremely low cost—a combination that's hard to beat!

The Akremite* Blasting Method!

(for large-diameter blast holes)

Large operators should consider this "do-it-yourself" plan. It's a sublicensing arrangement for producing and using Akremite blasting agent.

Maximum safety, fast handling, rock-bottom cost

Here's why you'll profit: designed for dry, large-diameter holes in medium-hard material—strip-pit, open-pit or quarry shooting—Akremite's combination of safety, work and cost advantages offers a lot for a little. It cannot be detonated by caps, friction, shock or Primacord—but relatively insensitive Nitramite® primers or properly sized dynamite primers do the job. Loading's fast because Akremite plastic bags are easy to handle and expand to fill the hole. Non-headache-producing—high energy—*amazingly* low cost.

Write for complete details

So if you're looking to increase safety and save money—investigate the use of Akremite NOW. You can make it yourself by a simple process, as many large coal strippers are doing. Or, if you prefer, you can buy Akremite direct from Du Pont. Write us for complete details, or contact any of the companies listed at lower left. E. I. du Pont de Nemours & Co. (Inc.), Explosives Department, Wilmington 98, Delaware.

---

* Licensed exclusively to the Du Pont Company under the Maumee Collieries Co. Process Patent No. 2,703,528 and presently sublicensed to . . .

AMERICAN CYANAMID COMPANY
ATLAS POWDER COMPANY
AUSTIN POWDER COMPANY
ILLINOIS POWDER MANUFACTURING COMPANY
INDEPENDENT EXPLOSIVES COMPANY
INDEPENDENT EXPLOSIVES COMPANY OF PENN.
KING POWDER COMPANY
OLIN-MATHIESON CHEMICAL CORPORATION
PACIFIC POWDER COMPANY
TROJAN POWDER COMPANY

AKREMITE BLASTING METHOD
LICENSED TO

DU PONT
REG. U.S. PAT. OFF.

BETTER THINGS FOR BETTER LIVING . . . *THROUGH CHEMISTRY*

field of solid fuels combustion.

Technical sessions at the conference included 12 papers and speeches by representatives of the U. S. and British governments and by U. S. coal industry experts. On the program for Britain was W. A. Macfarlane, chief executive, National Industrial Fuel Efficiency Service, London, and C. A. Masterman, British Ministry of Fuel and Power. Mr. Macfarlane spoke on "Industrial Fuel Utilization in the United Kingdom." Mr. Masterman addressed the group on "Underground Coal Gasification."

Among the other subjects discussed were: "The Impact of Atomic Energy on Fossil Fuels," by R. C. Dalzell, chief, Reactor Development Div., Atomic Energy Commission, and Harry Perry, chief, Branch of Bituminous Coal Research, USBM; "Coal as a source of Power for the Aluminum Industry," by F. G. Feeley, Jr., Olin Mathieson Chemical Corp., New York; and the "Changing Market Pattern for Solid Fuels," by George A. Lamb, manager, business surveys, Pittsburgh Consolidation Coal Co.

Pick Coal Show Committee; Matthews Named Chairman

In Washington, D. C., the American Mining Congress last month announced next year's convention and exposition program committee of men it had chosen

A. R. Matthews

on an industry-wide basis. The committee, the AMC said, would develop plans for the 1957 Coal Convention and Exposition scheduled to be held in Cleveland's public auditorium May 15-16. A. R. Matthews, president of Pocahontas Fuel Co., New York, N. Y., was named chairman. Mr. Matthews will preside over the committee's first meeting Nov. 15. The AMC says the coal industry meeting next May will be attended by several thousand mining men from every coal producing district in the nation. At the meeting thorough consideration will be given to every phase of coal production and preparation, at both deep mines and coal stripping operations, with a view toward attaining greater operating efficiency, lower costs, and broader markets for coal. In addition to the convention sessions, manufacturers of mining machinery will display all the necessities of modern coal mining.

The committee:

I. N. Bayless, pres., Union Pacific Coal Co., Omaha, Neb; **R. K. Beacham,** Fairview Collieries Corp., Big Four Bldg., Indianapolis 4, Ind; **A. P. Boxley,** prod. mgr., Eastern Gas & Fuel Associates, Koppers Bldg., Pittsburgh, Pa; **N. T. Camacia,** gen. mgr., Island Creek Coal Co., Holden, W. Va; **S. A. Caperton,** pres., Slab Fork Coal Co., Slab Fork, W. Va; **E. C. Carris,** consulting engineer, Box 808, Charleston 23, W. Va; **E. R. Cooper,** manager coal mines, Jones & Laughlin Steel Corp., 3 Gateway Center, Pittsburgh 30, Pa; **C. C. Cornelius,** vice pres., Joanne Coal Co., Union Trust Bldg., Pittsburgh 20, Pa; **W. J. Crawford,** vice pres., Enos Coal Mining Co., Oakland City, Ind; **Wm. Crawford,** vice pres., Powellton Coal Co., Mallory, W. Va; **E. E. Criswell,** vice pres., Compass Coal Co., Clarksburg, W. Va; **C. M. Donahue,** Mine Safety Appliances Co., Braddock, Thomas & Meade Sts., Pittsburgh, Pa; **W. Stuart Emmons,** Hulburt Oil & Grease Co., Trenton & Erie Aves., Philadelphia 34, Pa; **Wm. A. Gallagher,** vice pres., Stonega Coke & Coal Co., 2500 Fidelity-Philadelphia Trust Bldg., Philadelphia, Pa; **Theron G. Gerow,** mining consultant, 111 North Wabash Ave., Chicago 2, Ill; **D. N. Griffin,** vice pres., Deister Concentrator Co., Fort Wayne, Ind; **C. M. Guthrie,** gen. supt., Sinclair Coal Co., 3615 Olive St., St. Louis, Mo; **R. G. Heers,** gen. mgr., Kaiser Steel Corp., Oakland, Cal; **D. K. Heiple,** chief field engr., LeTourneau-Westinghouse Co., 2301 N. Adams St., Peoria, Ill; **James Hys-**

Preparation Facilities

Joanne Coal Co., Joanne mine, Rachel, W. Va.—Contract closed with Industrial Engineering & Construction Co. for a wet scrubber dust collector to be used in conjunction with already installed heat dryers. Completion, late 1956.

Eastern Gas & Fuel Associates, Keystone mine, W. Va.—Contract closed with Industrial Engineering & Construction Co. for r-o-m and rock handling facilities with an additional mine-run storage bin. Equipment includes a Streeter-Amet electronic scale system, a Nolan trip feeder and rotary dump, a Bradford breaker, and a 500-ton storage bin. The plant will have a capacity of 750 tph of mine run, which will be reduced to 7x0. Completion date, third quarter, 1957.

Inland Steel Co., Price, Ky.—Contract closed with the Link-Belt Co. for picking and crushing equipment.

Christopher Coal Co., Humphrey No. 7 mine, Maidsville, W. Va.—Contract closed with the Deister Concentrator Co. for 16 SuperDuty diagonal deck No. 7 coal washing tables and two model 108-B Concenco revolving feed distributors for feed distribution to the Super-Duty tables. Equipment concludes contract for furnishing 48 Super-Duty No. 7 tables and 10 Concenco distributors for Humphrey No. 7.

Brule Smokeless Coal Co., Otsego, W. Va.—Contract closed with the Deister Concentrator Co. for six No. 7 SuperDuty diagonal deck coal washing tables and one model 108 Concenco revolving feed distributor.

Pine Township Coal Co., Heilwood. Pa.—Contract closed with Robert Holmes & Bros., Inc., through Wilmot Engineering Co., for one Baughman Verti-Vane thermal coal dryer unit. Total wet feed to dryer unit: 50 tph of ¼x0 washed coal from sizing screen.

Brule Smokeless Coal Co., Otsego, W. Va.—Contract closed with Robert Holmes & Bros., Inc., for one Baughman Verti-Vane thermal coal dryer unit. Total wet feed to dryer: 70 tph of ⅜x0 screened raw coal and sludge.

Jamison Coal & Coke Co., Loveridge mine, Fairview, W. Va.—Contract closed with the Jeffrey Mfg. Co. through Fairmont Machinery Co. for two Baum jigs (three compartments, eight cells), 1,200 tph of 5x0.

Petitto Bros. Coal Co., Lost Creek mine, Lost Creek, W. Va.—Contract closed with Fuel Process Co. for a 120-in angle duplex Belknap washer complete with automatic specific gravity control and recovery system to wash 5x⅜ Pittsburgh or Red Stone seam coal. Capacity, 150 tph, washed coal. Probable completion, Nov. 15, 1956.

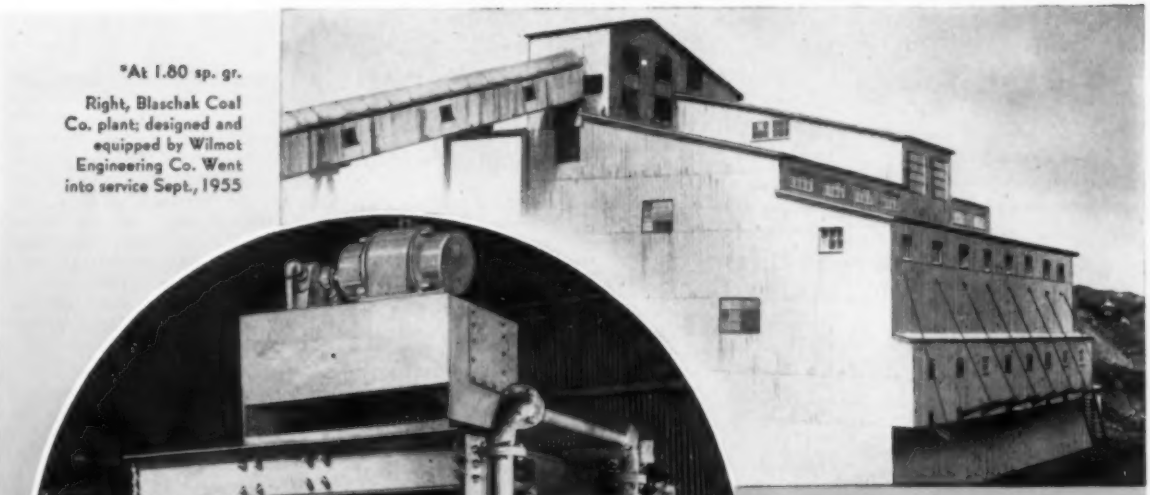
Lillybrook Coal Co., Killarney mine, Killarney, W. Va.—Contract closed with Fuel Process Co. for a C-2 Belknap tandem coal washing unit for recovering middlings and cleaned coal from hydro refuse. Size to be washed, 2x¼. Capacity, 30 tph of Pocahontas No. 3 refuse. The unit is an addition to present hydro washing facilities. Probable completion, Nov. 15, 1956.

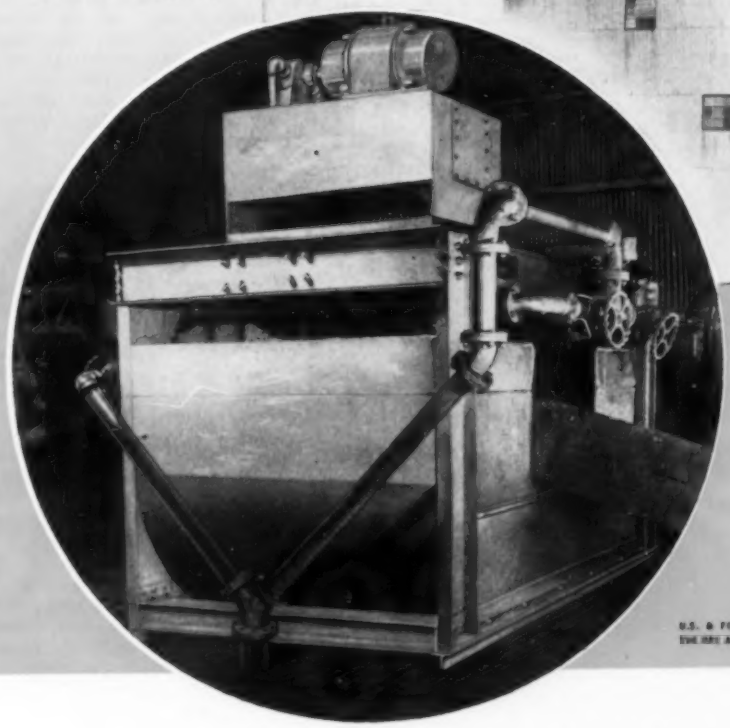
Wyatt Coal Co., Eskdale mine, Eskdale, W. Va.—Contract closed with the Fuel Process Co. for a cleaning plant addition, including raw coal crushing, washing, resizing screens and loading facilities for 200 tph. Six, 5x⅜ r-o-m to be washed in type M-6 heavy media Belknap washer. Probable completion, Feb. 1, 1957.

This Year-Old Plant Reports *LAB-TYPE SEPARATION with...

*At 1.80 sp. gr.

Right, Blaschak Coal Co. plant; designed and equipped by Wilmot Engineering Co. Went into service Sept., 1955





WILMOT-OCC HEAVY-MEDIA VESSEL

U.S. & FOREIGN PATENTS.

President Blaschak says:

"...After a year of operation we are most satisfied with the performance of our new preparation plant, engineered by your Company. The Wilmot-OCC heavy-media vessel is doing a splendid job: We have consistently maintained high separating efficiency and produced high quality products. The vessel operated throughout the past season without maintenance. Checks show loss of less than 1/3 lb of magnetite per ton of raw feed..."

Preparation Engineers for Nearly 50 Years

Plants built and/or equipped. Heavy-Media, Hydrotator, Classifier, Froth Flotation units. Pilot plant and lab for customers' testing use.

WILMOT

WILMOT ENGINEERING CO.

WHITE HAVEN, PA.
Exec. Offices:
HAZLETON, PA.

HUNTINGTON, W. VA.: PO Box 1831, Phone JAckson 5-2571

SAVE MONEY!

UNUSED

6X6 ARMY TRUCKS

2½-ton GMC & International

- **From Government Storage!**
- **Unused and Guaranteed!**
- **Factory New Condition!**
- **Reconditioned Trucks also Available!**

Save up to $3,000 on one of our unused Army trucks. See for yourself how TWO of our trucks cost you even LESS than *one* new truck.

Compare our Tandem Axle Trucks with front wheel drive, 10 forward speeds, overdrive and new mud and snow tires with similar equipment elsewhere.

Investigate now! . . . There's no obligation . . . and we deliver on approval!

For Specifications, Prices, Delivery Write, Wire or Phone Collect—JAckson 5-7841
MILTON Y. TOOMBS, JR.
Sales Manager

MEMPHIS EQUIPMENT Company
CONSTRUCTION AND AUTOMOTIVE EQUIPMENT AND PARTS
786 SO. THIRD ST. MEMPHIS, TENNESSEE

News Roundup *(Continued)*

lop, pres., Hanna Coal Co., St. Clairsville, Ohio; **David Ingle, Jr.,** pres., Ingle Coal Co., Elberfeld, Ind; **W. C. Jones,** vice pres., Jeddo-Highland Coal Co., Jeddo, Pa; **J. M. Kerr,** gen. mgr., Berwind White Coal Mining Co., Windber, Pa; **R. L. Killebrew,** Westinghouse Electric Corp., 10-L Bldg., E. Pittsburgh, Pa; **A. E. Lamm,** exec. vice pres., Sunnyhill Coal Co., 150 E. Broad St., Columbus, Ohio; **H. E. Mauck,** gen. mgr., Olga Coal Co., Coalwood, W. Va; **W. L. McMorris, Jr.,** mgr. coal preparation, U. S. Steel Corp., Wm. Penn Pl., Pittsburgh 30, Pa; **L. O. Millard,** Link-Belt Co., Prudential Plaza, Chicago 1, Ill; **M. D. Millard,** gen. mgr. of sales, American Steel & Wire Div., U. S. Steel Corp., Rockefeller Bldg., Cleveland 13, Ohio; **W. D. Moreman,** vice pres. of sales, Sanford-Day Iron Works, Inc., Box 1511, Knoxville 9, Tenn; **E. M. Pace,** gen. supt., Inland Steel Co., Wheelwright, Ky; **Moss Patterson,** vice pres., West Ky. Coal Co., Madisonville, Ky; **C. B. Peck,** mgr. of industrial sales, Anaconda Wire & Cable Co., 25 Broadway, New York 4, N. Y; **Adrian W. Rich,** pres., Fairmont Machinery Co., Fairmont, W. Va; **H. C. Rose,** pres., Pittsburgh Coal Co., Library, Pa; **S. F. Sherwood,** pres., Stonefort Corp., Merchants Bank Bldg., Indianapolis 4, Ind; **M. A. Shoffner,** gen. mgr., Freebrook Corp., Kattanning, Pa; **H. H. Smith,** mgr., mine sales, National Malleable & Steel Castings Co., 10600 Quincy Ave., Cleveland 6, Ohio; **R. B. Warren,** mgr. industrial sales, Goodyear Tire & Rubber Co., 1144 E. Market St., Akron, Ohio; **W. L. Wearly,** exec. vice pres., Joy Manufacturing Co., Oliver Bldg., Pittsburgh 22, Pa; **R. R. Williams, Jr.,** mgr. mines, Colorado Fuel & Iron Corp., Pueblo, Colo; **Robert E. Young,** Harnischfeger Corp., 4400 W. National Ave., Milwaukee 14, Wis.

News Briefs

The Federal Power Commission last month authorized Texan Eastern Transmission Corp. to import up to 200,000 Mcf of natural gas per day from Petroleos Mexicanos (Pemex), a Mexican government authority. The FPC tossed out objections by the National Coal Assn., the Fuels Research Council and the United Mine Workers Union. It also disregarded its own staff council's recommendations that volume be held to 117,303 Mcf. In its decision FPC said it could not see where coal would be displaced by the Mexican gas.

In Cincinnati last month, Secretary of Labor James P. Mitchell, said at the UMWA convention that he would "do everything I can to see that small (TVA) contracts are not let as a subterfuge to get around complying with the Walsh-Healey Act." Mr. Mitchell's subject was TVA and the Walsh-Healey Public Contracts Act. He said: "I realize that some mining contracts for less than $10,000 are entered into and that the Walsh-Healey Act does not apply to such contracts. I want to pledge to you here and now that I shall use my best efforts to see that where mining contracts are entered into for less than $10,000, it is because less than $10,000 worth of coal is needed."

A fund of $660,000 has been distributed among 120 coal miners living near Macon, Mo. The money had been a trust and retirement fund set up by the Bevier Coal Co., but the fund was abolished when the company was bought by the Peabody Coal Co.

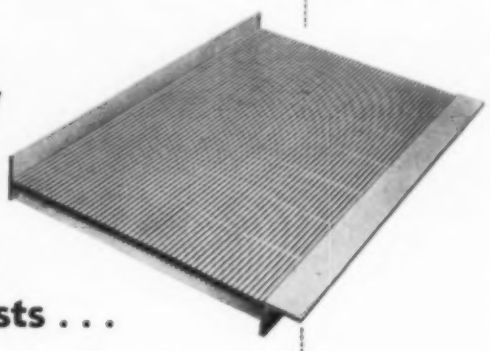
National Coal Co. mines placed first and second Oct. 6 in the Western Kentucky Mining Institute annual First-Aid Contest. The company's Crescent mine from Kentucky's Muhlenberg County and its Uniontown mine were first and second. Third place was won by the East Diamond mine, Madisonville, Ky., a property of the West Kentucky Coal Co.

Descriptions of courses and outlines of curricula occupied the National Coal Assn.'s committee on vocational training and education at the School of Mines and Metallurgy in Rolla, Mo., Oct. 5 and 6. Heads of departments discussed respective curricula with committee members

MEETINGS

Kentucky Mining Institute; Annual Meeting, Nov. 8-9, Phoenix Hotel, Lexington, Ky.

sure way to cut screening costs . . .



Replace your present screens with Hendrick Wedge Slot . . . the continuous slot screen that can't be beaten for screening and dewatering operations. Hendrick Wedge-Slot has small openings yet affords far greater draining and screening capacity.

Profile bars are shaped to maintain uniform width of slot openings as wear progresses. Long screen life and high coal quality are always maintained. For information on the type of Wedge-Slot best suited to your particular operating methods, call Hendrick today!

Perforated Metal • Perforated Metal Screens • Wedge-Slot and Hendrick Wedge-Wire Screens • Architectural Grilles • Mitco Open Steel Flooring • Shur-Site Treads • Armorgrids • Hendrick Hydro Dehazer

Hendrick

MANUFACTURING COMPANY

41 DUNDAFF STREET, CARBONDALE, PA.

Sales Offices in Principal Cities

SEE OUR CATALOG IN SWEET'S

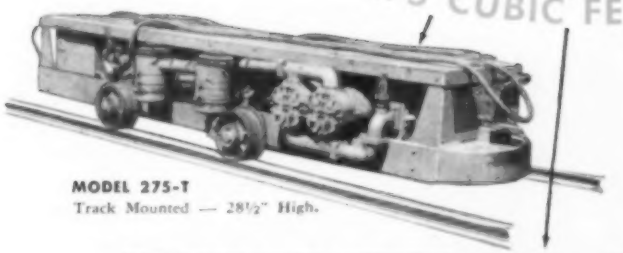
See our Catalog in SWEETS

ACME MINE COMPRESSORS–

Rugged • Dependable • Maneuverable • Self-Contained

...and VERSATILE

275 CUBIC FEET OF AIR



MODEL 275-T
Track Mounted — 28½" High.

MODEL 275-S
Low Coal Special — 29" overall — Less if it is to be mounted in a carrier.

MODEL 275-SPRHS
Rubber Mounted — Self Propelled. Two stoper Jumbo Arms with stopers and dust collectors — 54½" high with 9" ground clearance.

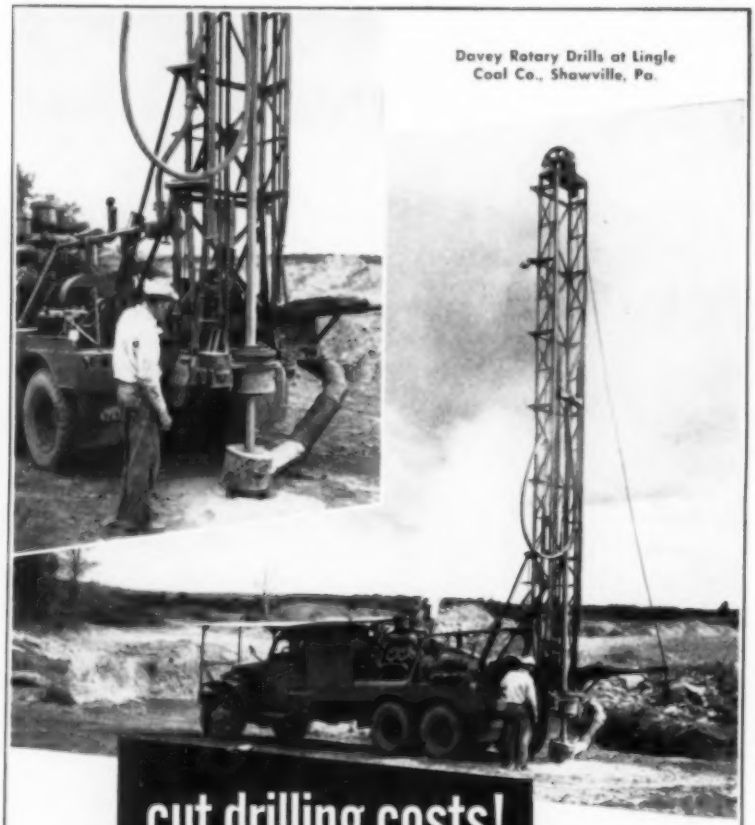
MODEL 275-TD
Track Mounted — 2 Drifter Jumbo Arms and Heavy Duty Drills for Rock Work. Arms may be interchanged with stoper Jumbo Arms.

One of these machines will fit YOUR mine conditions.
Variations such as with or without cable reels, variable ground clearance, seats, etc. are available. Full hydraulic drive and steering. Parking and tramming brakes.

Write or call us and let us quote on your requirements —
We will be glad to demonstrate in YOUR mine.

ACME Machinery Company

WILLIAMSON, WEST VIRGINIA



Davey Rotary Drills at Lingle Coal Co., Shawville, Pa.

cut drilling costs!

DAVEY

ROTARY DRILLS

For faster, more economical drilling . . . increased coal production at lower costs, leading strip operators rely on Davey. Suitable for mounting on any make of truck, Davey Rotary Drills move fast between blast holes . . . are ideal for low cost core drilling with air . . . easy to set in drilling position.

Daveys are available in 6 different models—air blast, mud pump, or combination types. Rated capacities to 2,000 ft. Outstanding features include choice of power take-off or separate power unit operation, automatic hydraulic feed, hydraulic pull down, heavy-duty rotary table, rugged tubular box-type mast . . .

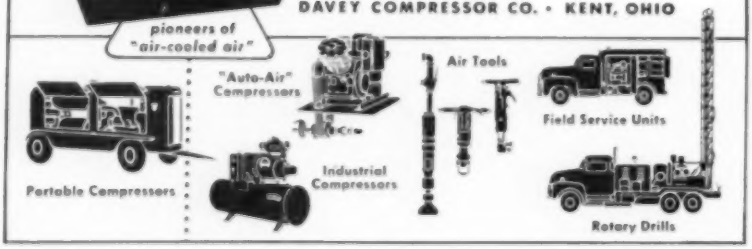
AA-1697

Write for full details!

DAVEY

pioneers of "air-cooled air"

DAVEY COMPRESSOR CO. • KENT, OHIO



News Briefs *(Continued)*

in a series of talks and department professors outlined specific mining courses. The NCA committee opened its visit with a tour of the campus with special attention to the Department of Mining building. Later, in an executive session, the committee agreed to hold its next meeting at Virginia Polytechnic Institute May 3 and 4, 1957.

Reynolds Mining Corp. has exercised its option to purchase land near Lake DeSmet, Wyo., for possible construction of an aluminum reduction plant. Reynolds, a subsidiary of Reynolds Metals Co., has been considering for two years the feasibility of erecting an aluminum plant at Lake DeSmet, utilizing the vast soft coal deposits in the area. Pacific Power and Light Co. and Reynolds have been working together on plans for a steam generating power plant to supply Reynolds with its power if it is decided to erect the aluminum plant.

Bituminous Output

YEAR TO DATE	PRODUCTION
Oct. 13, 1956	390,480,000
Oct. 15, 1955	358,914,000

1956 output 8.8% ahead of 1955.

A month earlier output was 9.1% above 1955.

WEEK ENDING	PRODUCTION
Oct. 13, 1956	10,230,000
Oct. 15, 1955	9,808,000

Anthracite Output

YEAR TO DATE	PRODUCTION
Oct. 13, 1956	22,050,000
Oct. 15, 1955	20,323,000

1956 output 8.5% ahead of 1955.

A month earlier 1956 output was 8.0% ahead of 1955.

WEEK ENDING	PRODUCTION
Oct. 13, 1956	686,000
Oct. 15, 1955	529,000

More than 13,500,000 tons of lignite coal will be the minimum required for the Saskatchewan Power Corp.'s new $40 million steam generating station at Estevan, near the North Dakota border, for the years between 1958 and 1968. The plant will be under construction shortly. Bids have been called by the corporation for strip mining an area on a site in Long Creek Valley adjacent to the power plant. Proven reserves on the basis of a 1955 survey indicate 55,000,000 tons of coal in the area beneath an overburden 40 to 85 ft. Heat content

DEEP MINING

STRIPPING

COAL PREPARATION

MAINTENANCE

SUPPLIES

SAFETY

BUYING DIRECTORY

No Matter What Your Job, You'll Find...

The COAL AGE Mining Guidebook and Buying Directory Issue is a useful, practical working manual

The largest, most complete single source of information on current mining practice available anywhere, the COAL AGE "Guidebook" will help you develop new ideas, a fresh slant on operating problems, the latest mining methods and equipment.

The 62-page Buying Directory lists for speedy reference all the known manufacturers of over 1,000 products used in coal mining, completely revised and up-dated for the 1956 edition. This comprehensive guide, along with the manufacturers' advertising and the Index to Advertisers' Sales Offices and Distributors, will help you quickly locate the nearest source of equipment, materials and services meeting your particular needs.

KEEP YOUR 1956 GUIDEBOOK HANDY . . . USE IT REGULARLY

TWO LOAD-SPEEDING

NO FOOT-BRAKING DOWN-GRADE! Heap-loaded "95" rolls safely down to the fill at 10 mph. Hand-operated Torqmatic brake is standard equipment, gives accurate control at any speed...on any grade.

International® "95" Payhaulers®

average 2400 cu. yds. of rock daily!

High speed (up to 38 mph), 16 cu. yd. capacity, and next-to-automatic operating control of two new International "95" Payhaulers are getting Clarkson Construction Co. record-breaking rock production of 2400 cu. yd. per 10-hour day. Payhaulers are producing this outstanding yardage on the company's 1000-foot cut through dolomite limestone—part of their 7.5 mile, 2-lane highway contract between Bonne Terre and Halifax, Mo.

The Payhaulers are operating on a 2000-foot cycle which includes a 12% grade. On this grade, too tricky and treacherous for Clarkson's other rock haulers, Payhaulers maneuver speedily and safely downgrade —under positive Torqmatic braking control! Payhaulers' high speed of up to 38 mph also permits the fast average round-trip travel time of only 2 min., 45 sec. That's faster than the 3 cu. yd. shovel can load one!

H. D. Brown, project superintendent, says, "The Payhaulers have got all other rock trucks beat. Control we've had with Payhaulers on this job is something we didn't have on any other truck. We've averaged 150 to 162 loads of 16 to 18 cu. yd. per 10-hour day. It's the best production I've ever had!"

Other veteran rock men who have used or seen the International "95" Payhauler in action say the same thing. You'll join them, too! Ask your nearby International Construction Equipment Distributor to give you a demonstration.

"Best Production I've ever had,"

Says H. D. BROWN
Project Superintendent,
Clarkson Construction Co.,
Kansas City, Mo.

BODY UP...DOWN...IN ONLY 12 SECONDS! 3-stage hydraulic hoist gives full-time control. Snubbing assures smooth dumping, gentles body return.

TWO-TON CHUNKS OF LIMESTONE bang into the Payhauler. High-tensile steel sides, triple-section bottom, super-duty "spring cushions," plus strongest frame in "95's" class take rock-shock!

A COMPLETE POWER PACKAGE INCLUDING: Crawler, Wheel, and Pipe-Boom Tractors... Self-Propelled Scrapers and Bottom-Dumps... Crawler and Rubber-Tired Loaders... Off-Highway Trucks... Diesel and Carbureted Engines... Motor Trucks

INTERNATIONAL® CONSTRUCTION EQUIPMENT

International Harvester Company
180 North Michigan Avenue, Chicago 1, Illinois

News Briefs *(Continued)*

of the lignite approximates 6,600 Btu's per lb. The steam generating plant is to be built in four stages beginning late in 1957, each stage to consist of one 66,000-kw generator.

Six mine workers employed by Eastern Gas & Fuel Associates in West Virginia and Pennsylvania have established the EG&FA employment record. Each of the men has been mining coal for 40 yr. They are William Miller, Beards Fork, W. Va.; William L. Straight, Federal No. 1, Grant Town, W. Va.; Warren L. Goodson, Keystone, W. Va.; John B. Lazor, Sonman, Portage, Pa.; Grant D. McQuillen and George F. Seabolt, also Sonman.

An allied group of coal, rails, labor and gas pipeline companies were denied motions by a Federal Power Commission examiner early last month to dismiss applications by three pipeline companies seeking to import and export natural gas in and out of Canada and the United States in cooperation with the Trans-Canada Pipeline Co. The three pipeline companies (Midwestern, Tennessee and Iron Ranges) hurdled the attempted block when the FPC examiner held that a requested dismissal "would not be in keeping with the public interest and would deprive applicants of procedural due process." The examiner asserted that the pipeline companies were seeking to fill known gas needs in the midwest, adding that the petitioners cannot deny "the existence of unsatisfied demands for natural gas in that area." More, the examiner said: "The contention that the interim export of gas for use in the Montreal area will harm the coal, labor and railroad interests which produce, transport and export substantial quatities of anthracite and bituminous coal for consumption in Montreal is an assumption without basis in the record; would not necessarily be controlling in

(Continued on p 144)

EQUIPMENT APPROVALS

Four approvals of permissible equipment were issued by the U. S. Bureau of Mines during September.

Goodman Mfg. Co.—Type 2420 cutting machine; two motors, one 50 hp and one 30 hp, 230 v, DC. Approval 2-1170, Sept. 5.

Wilcox Mfg. Co.—Wilcox miner; two motors, one 50 hp and one 10 hp, 230 v, DC. Approval 2-1171, Sept. 10.

The Long Co.—Type PT piggyback conveyor; one motor, 5 hp, 220 or 440 v, AC. Approvals 2-1172/2-1172A.

The Long Co.—Model 400-F face conveyor; one motor, 5 hp, 230 v, DC. Approval 2-1173, Sept. 26.

TWO TOOLS

that bring further automation to **your coal production**

In the coal industry, Simplicity Os-A-Veyor Feeders have proven themselves to increase operating efficiency and lower the costs of maintenance. Simplicity Os-A-Veyor Feeders are self-cleaning units which experience none of the carryback or spillage found in other types of feeders. They are designed to decrease bridging and provide even feeding. The oscillating action is provided by two eccentric shafts coupled to a single V-belt drive, leaving only one assembly and four bearings to lubricate. Os-A-Veyor Feeders can be either main frame supported or bin-hung by springs and cables.

Simplicity Grizzly-Feeders can cut your coal handling costs 50% because they combine two operations . . . scalping and feeding . . . in one machine. Old type feeder plus stationary grizzly are eliminated, thus saving you both plant room and operating and maintenance expense. Available in sizes from 2′ x 8′ to 6′ x 12′, and in capacities up to 1000 tons per hour, the Simplicity Grizzly-Feeder has already improved production for many coal operators, and can do the same for yours. This is a rugged, simply-designed unit that will give you maximum output with very little maintenance.

Write us for full information on both the Simplicity Os-A-Veyor Feeder and the Grizzly-Feeder.

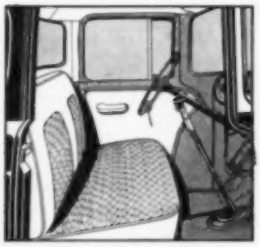
Simplicity
TRADE MARK REGISTERED

ENGINEERING COMPANY • DURAND 19, MICHIGAN

SALES REPRESENTATIVES IN ALL PARTS OF THE U.S.A.
FOR CANADA: Simplicity Materials Handling Limited, Guelph, Ontario
FOR EXPORT: Brown and Sites, 50 Church St., New York 7, N.Y.

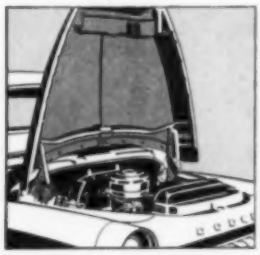
172

FIRST NEW



NEW COMFORT CABS

Industry's largest, for real stretch-out comfort. All-new seat design permits adjustment of back cushion and seat height, plus normal slide positioning.



FULL-OPENING HOOD

Exclusive!—Can be raised full 90° for easiest, fastest engine servicing, half-way for routine oil and water checks.

Stake models up to 21,000 lbs. G.V.W.

SHOWING

DODGE

PowerGiants

- **NEW giant-power V-8 engines!**
- **NEW push-button driving!**
- **NEW higher load capacities!**
- **NEW *Forward* Look Styling!**

Get set to profit from a great *new* kind of truck—with *more* V-8 power and *more* payload capacity—with *more* eager-to-go snap than any other make on the road!

From 204-hp. pick-ups to 232-hp. tandems, today's new low-priced V-8 Dodge *Power Giants* deliver more truck per dollar—and more profitable payloads—in *every* weight class, 4,250 lbs. G.V.W. to 65,000 lbs. G.C.W.

New short-stroke Chrysler-engineered V-8's—with exclusive Power-Dome combustion—give you more miles per gallon, full power on *regular* gas. Increased power in famous, dependable Dodge 6's, too.

Push-button automatic transmission is still another great plus you get only in new Dodge *Power Giants.** First in any truck! Simple, sure, trouble-free. Just push a button, shifting is automatic.

Test-drive a Power Giant—V-8 or 6—soon! Get your Dodge dealer's deal *before* you decide on your new truck.

**Available on low-tonnage and forward-control models.*

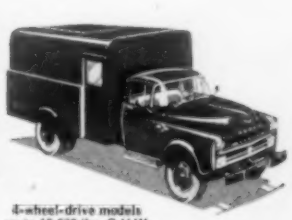
DODGE TRUCKS

WITH THE *FORWARD* LOOK

4 pick-up models up to 8,800 lbs. G.V.W.

Tandem models up to 46,000 lbs. G.V.W.

Tractor models up to 65,000 lbs. G.C.W.



4-wheel-drive models up to 18,000 lbs. G.V.W.

Maintenance Group Meets

Mining Electro-Mechanical Maintenance Association, organized in 1948, holds 4th annual meeting at Greensburg, Pa.

1956-57 OFFICERS—R. S. James (left), USBM, president; M. J. Mechling, Valley Camp Coal Co., 1st vice president; J. H. Fleming, Joy Mfg. Co., 2nd vice president; C. S. Conrad, Consolidation Coal Co. (W. Va.), 3rd vice president; and A. E. Molinski, Bethlehem Mines Corp., secretary-treasurer.

ME-MMA PROGRAM included talks by D. C. Jones (left), Penn State University J. W. Woomer, consultant, Pittsburgh; J. E. Elkins, Duquesne Light Co., and D. R. Mitchell, Penn State. W. E. Hess, Jones & Laughlin Steel Corp., was master of ceremonies at evening banquet.

MORE THAN 260 MAINTENANCE MEN and supervisors, coal company officials, manufacturers' representatives and others interested in promoting increased safety and efficiency through better maintenance of mining equipment convened for a paper session and banquet at the 4th Annual Meeting of the Mining Electro-Mechanical Maintenance Association, Greensburg, Pa., Oct. 6. The attendance, which was double that of a similar meeting a year ago, reflects growing interest and participation in the 8-yr-old organization.

As reported in a welcoming address by R. S. James, chief, research and development section, U. S. Bureau of Mines, Pittsburgh, and ME-MMA president, the association now comprises eight branches which hold monthly meetings on timely maintenance topics for mechanics and electricians in Pennsylvania, Ohio, West Virginia and Utah. Good prospects for additional branches are evident in Virginia, Colorado, Indiana, Illinois, Alabama, southern West Virginia, and Pennsylvania anthracite, Mr. James said.

In declaring that the association's service to the industry must be broadened and expanded, Mr. James noted that maintenance training must be a continuing effort, since not "just anybody" can be entrusted with servicing the $100,000 machines now common in the industry. Mr. James employed the occasion to suggest also that his listeners give serious thought to the need for recruiting intelligent young men to fill the maintenance staffs that will be needed in coal's brightening future.

R. A. Huth, manager, mining division, Universal Welding & Metals, Inc., Pittsburgh, presided at the afternoon session and also served as chairman of the program committee.

Lead-off speaker at the afternoon technical session was D. C. Jones, director, Mineral Industries Extension Services, Pennsylvania State University, University Park, Pa., who recounted highlights in the history of U. S. coal mining in the period from 1776 to 1956. Mr. Jones listed some mileposts, as follows:

1. **Earliest record of recognition of coal in America** was in 1672 on Cape Breton Island, Nova Scotia. Other early discoveries include that of the explorer, Joliet, along the Illinois River, about 1673, and discoveries of Pennsylvania bituminous and anthracite in the Mid-18th Century.

2. **First commercial mining of anthracite** near Pittston, Pa., in 1776.

3. **Total U. S. production (bituminous and anthracite) in 1870** was 33,310,905 tons. This increased over the next decade to a total of 71,067,576 tons in 1880. Capital investment in the industry at that time was about $250 million.

4. **U. S. production exceeded that of Great Britain** for the first time in 1899; 253 million tons for the U. S. and 246 million for Great Britain.

5. **Peak production for anthracite** was 99,611,811 tons in 1917; for bituminous 630,623,722 tons in 1947.

6. **Gunpowder for breaking coal** was introduced in 1818 at an anthracite mine at Plymouth, Pa., and dynamite was first used in anthracite mining in 1880. In 1902, permissibles appeared.

7. **Steam power, in a locomotive, was introduced in 1814**; electric power, for coal cutting, in 1885.

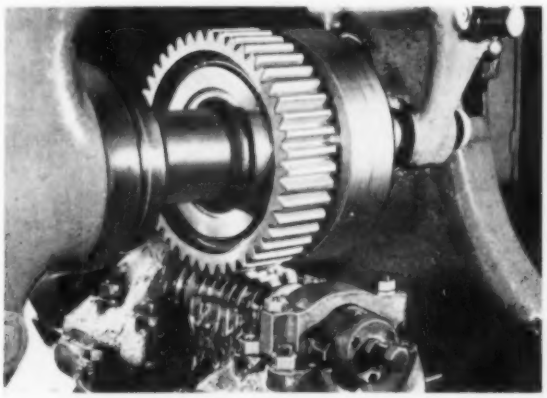
8. **The Stanley Header,** which cut from the solid and deposited the coal at the rear of the machine, was tried in Colorado in 1888.

Mr. Jones concluded with an account

Your Allis-Chalmers equipment deserves *True Original Parts*

Why? Because they meet design, manufacturing, inspection and packaging standards that assure long life . . . budget-stretching low-cost operation.

DESIGNED WITH THE ORIGINAL EQUIPMENT. Each Allis-Chalmers True Original Part benefits from a fine metallurgical research program. Each is designed by experienced engineers to do its full share of the work . . . just as each component in your Allis-Chalmers machines did when this equipment was new.



PRODUCED ON MODERN MACHINES BY SKILLED CRAFTSMEN. Here's where modern manufacturing equipment and know-how combine to produce precision parts. This combination is the reason you can be sure of getting full work power from any Allis-Chalmers equipment in which True Original Parts are used.

CAREFULLY INSPECTED FOR PRECISION FIT. Every Allis-Chalmers part goes through rigid original-equipment inspection processes and testing routines. Gears are checked many times — for perfect meshing, true balance, full capacity.

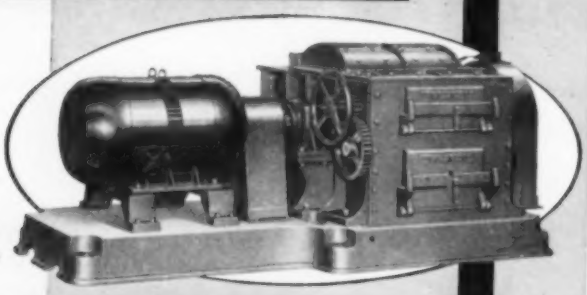
PROPERLY PACKAGED FOR LASTING PROTECTION. Many are specially treated to protect against rust and dust. Others are safety-packed to guard against nicks, scratches or handling damage.

True Original Parts are available at your Allis-Chalmers Construction Machinery dealer—where factory-trained servicemen are on hand to help you at all times.

ALLIS-CHALMERS, CONSTRUCTION MACHINERY DIVISION, MILWAUKEE 1, WISCONSIN

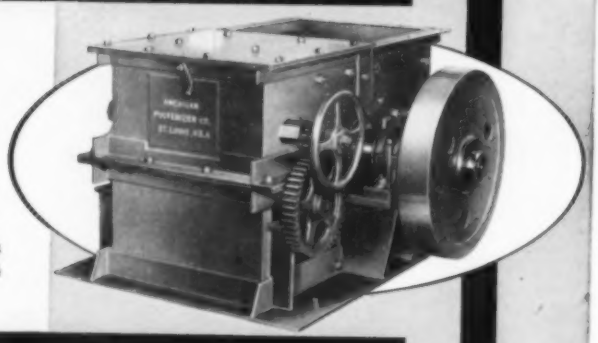
ALLIS-CHALMERS

When You Figure . . .



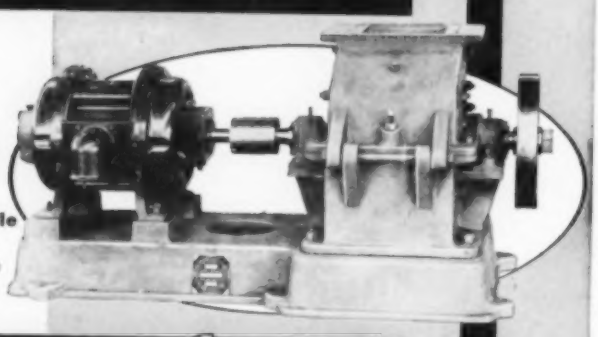
AC Series
capacities to
800 TPH

Reduction
Cost Per Ton . . .



WC Series
capacities to
90 TPH

the Best Answers*. . .



Coal Sample
Crushers
capacities to
2000 Lbs.
Per Hr.

Come from American
Ring Coal Crushers

*In a recent independent survey, it was found that American Crushers reduced over 61,000,000 tons of coal at a parts replacement cost (including standby parts) of less than 1/10th of 1¢ per ton.

THERE CAN BE NO BETTER PROOF OF AMERICAN QUALITY!

American
PULVERIZER COMPANY

WRITE for Literature on These Crushers

1119 MACKLIND AVE. • ST. LOUIS 10, MO.

MEMMA *(Continued)*

of the development of conveyors, trackless mining and, now, continuous mining.

MINING IN 1976

Continuing where Mr. Jones concluded, J. W. Woomer, head of J. W. Woomer Associates, Inc., Pittsburgh, Pa., looked ahead to possible trends in the industry over the next 20 yr, up to 1976. Acknowledging that predicting the future is dangerous, Mr. Woomer nevertheless pointed to a need for 800,000,000 tons of coal in 1975. Assuming that the same work force is available 20 yr hence, a productivity level of 4,000 tons per man yr will be required to meet the 800,000,000-ton goal. This is up considerably from performance in conventional mining (1,900 tons per man yr) and modern continuous mining (2,500 tons per man yr).

Today, $15,000 is invested in the industry to provide one job. In 1976, a capital investment of $33,000 per job will be the rule, Mr. Woomer estimated. The main shift in job classification will be an increase in the number of "back-up" men in support of facemen. The ratio now is 1.7 service men for every faceman. In 1976, the ratio is expected to be three service men for every faceman.

Technical changes in the industry most likely will include continuous miners for thin seams, AC power at the face, built-in roof-support equipment on mining machines, fully-automatic lubrication, increased use of electronic controls, television, methane alarms and so on, and mechanized offices.

Right now, 17½% of the labor force is engaged in maintenance work. In 1976, 27½% of all employees may be employed in maintenance work. This would mean 49,000 maintenance employees, an increase of 88% in the next 20 yr. Employment at the immediate face may be reduced as much at 62% to a 1976 level of 38,200 men.

There will be an overriding need for good tools, good shops and good working conditions for maintenance men. In the meantime, men in the industry must do a good job to attract the capital that will be needed to finance this expansion, and intelligent young men should be recruited beginning now.

THE ATOM AS FUEL

J. E. Elkin, manager of mines, Duquesne Light Co., Pittsburgh, Pa., turned the attention of the association to the impact atomic energy might have in this picture of coal's expected growth. Pointing out that there is fairly complete agreement on the influence atomic power will have, Mr. Elkin reported that 550 billion kwhr were generated in 1955, and the need in 1976 is expected to be 2,000 billion kwhr.

Indications are that all sources of energy will have to strain to satisfy this demand. Coal now supplies the energy for about 54% of our electric power, but in 1976 it will be called upon to supply up to 65% of the energy, in the face of a four-fold increase in total power demand. This assumes that in 1976, atomic energy will undergird about

Clean-up takes only a few minutes per shovel because of Tournatractor's 17 mph forward and 7.3 mph reverse speeds. In addition to saving time, speedy tractor-on-rubber keeps loading sites and haul roads cleaner because it can get around to each shovel more times per day than a crawler-tractor.

Kaiser Steel Corp.

speeds pit clean-up with Tournatractor

1 rubber-tired rig replaces 2 crawler-tractors

Working their Eagle Mountain Iron Mine, Eagle Mountain, California, Kaiser Steel Corp. find they get more clean-up work done faster with 1 Model C Tournatractor than if they assigned 2 crawler-tractors to handle the same job. The new tractor-on-rubber replaced one full-time crawler, and does the part-time plant and pit maintenance work formerly assigned to a second track-type machine. The change to the faster, more maneuverable 208 hp Tournatractor enables the mine to keep haul units moving with less delays due to spillage or uneven pit floors.

3 to 4 times faster than crawlers

Tournatractor handles all clean-up assignments around 3 shovels. It shuttles back and forth at speeds up to 19 mph, which is 3 to 4 times faster than the top speed of any crawler. In addition, reverse speeds to 8 mph allow unit to back away quickly without interfering with loading operations. Big 21.00 x 25 low-pressure tires provide plenty of flotation and traction. They stand up well despite abrasive and rocky footing around pit floor.

Also used for pulling and pushing

In addition to clean-up and bulldozing, the 208 hp tractor pulls air compressors to drilling sites and moves the frame supports which carry electric cable for shovels, drills, and other equipment.

Get all the facts

Pit owners all around the world are taking advantage of the ease of maintenance, durability, speed, and high production of the Tournatractor. If you are interested in these same benefits for your mine, get all the details from your Distributor today.

Tournatractor—Trademark Reg. U.S. Pat. Off. T-828-M-bww

Tournatractor also cuts downtime for air compressors and other equipment when moving them from one location to another. Tournatractor gets on the job quicker . . . gets to the next assignment quicker. 1500 ft. is less than a minute away.

LeTourneau-WESTINGHOUSE Company, PEORIA, ILLINOIS

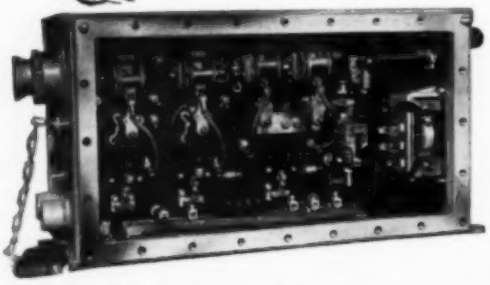
A Subsidiary of Westinghouse Air Brake Company

ARBA See you at the ROAD SHOW • Chicago • January 28-February 2, 1957

FIRST CHOICE OF
MINE OPERATORS...

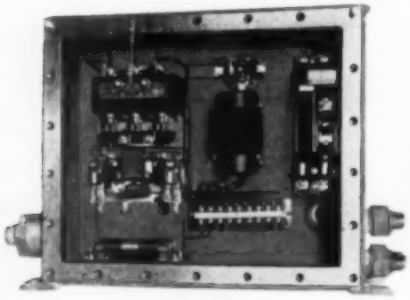
ENSIGN
ELECTRIC STARTERS

Standard of the industry for safe and efficient starting of all types of heavy electrically operated mine machinery.



ENSIGN Bulletin 5392
Reduced Voltage Starter

Sturdily designed and dependably built for smooth, efficient operation of belt conveyor systems and other heavy mine equipment. Three point acceleration—reversing, with reversing switch interlocked to prevent plugging—Bureau of Mines explosion-tested enclosure. 20-30 HP, 230 Volt D.C. capacity.



ENSIGN Bulletin 6320
40 H.P. A.C. Magnetic Starter

Bureau of Mines explosion tested enclosure—non-reversing with air circuit breaker and selector switch. Available in manual and magnetic reversing.

Product of ENSIGNeers

ENSIGN
ELECTRIC AND MANUFACTURING CO.

914 Adams Avenue Huntington 4, West Va.

MEMMA *(Continued)*

7½% of our electric-power demand. Thus, power generation alone will consume about 540 million tons of coal.

Atomic energy is coming, Mr. Elkin said, but 1976 is relatively distant. In the meantime, coal will be needed in increasing quantities, while the first generation of atomic plants, now under construction, are upgraded and improved in second and perhaps third generation units. Then atomic energy is expected to provide competitively priced power, complementary to coal-based power, not supplemental to it.

TRAINING REQUIREMENTS

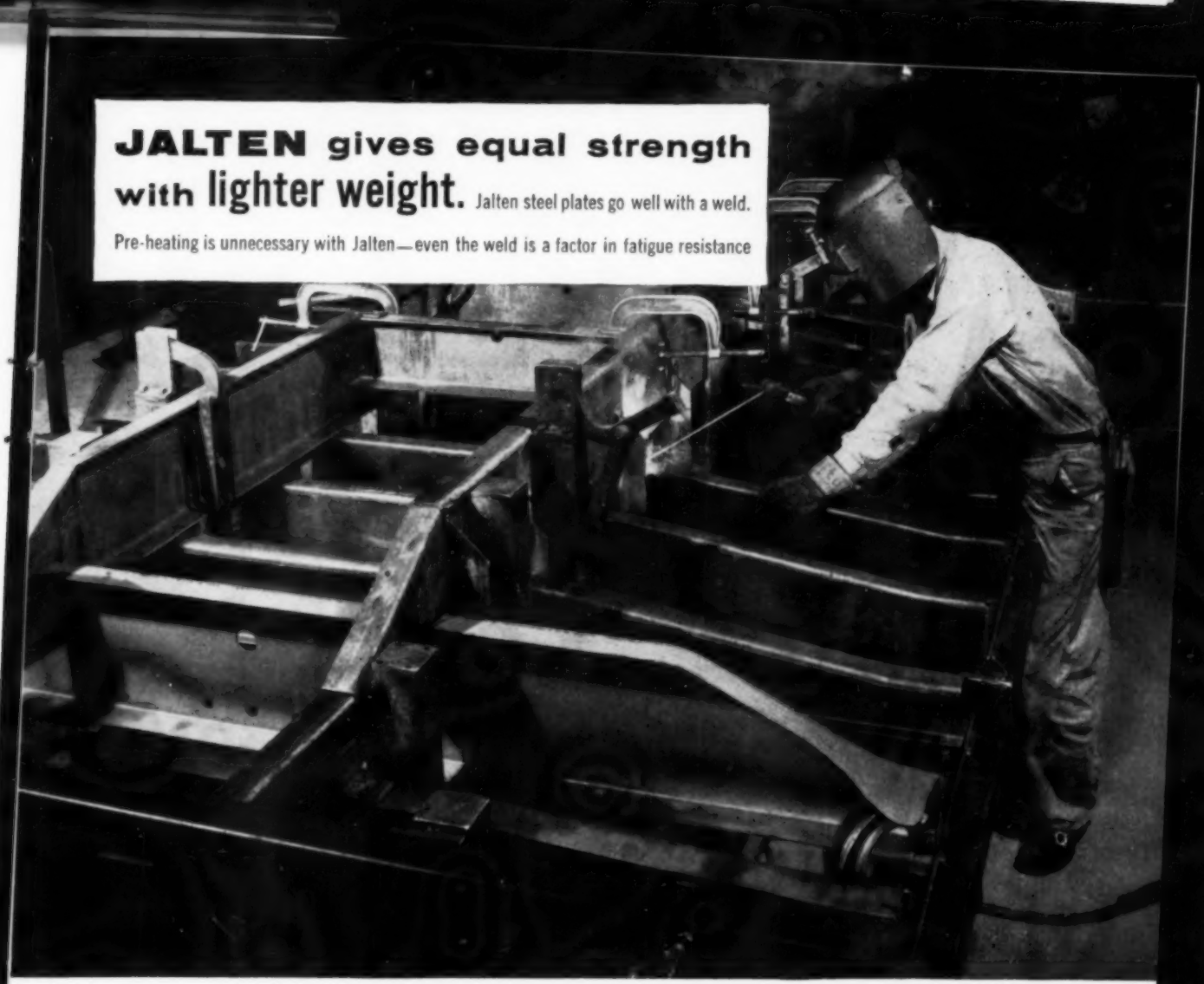
Concluding the program, D. R. Mitchell, chairman, Div. of Mineral Engineering, Penn State University, University Park, Pa., reminded the group that in the drive for higher standards in wages, every increase places greater responsibility for reduced costs on maintenance men. They will need to be highly-trained, carefully-selected technicians in the coal mine of the future. The responsibilities of all educators and training leaders will grow apace if such men are to be found in the industry as the need grows. Prof. Mitchell relinquished a portion of his time to R. B. Hewes, in charge of supervisory training, Penn State Mineral Industries Extension Services, for a brief report on mining in Turkey. Mr. Hewes recently returned after a year in that country on a training mission. Among the special problems in Turkish mining mentioned by Mr. Hewes are: pitching seams, numerous faults, shortages of skilled labor and supervisors, and rotation labor.

News Briefs *(from p 137)*

any event; and ought not to be urged in a motion to dismiss." The effect of large quantities of Canadian gas dumped on American markets was not mentioned.

Five Boone County coal miners in West Virginia, all newcomers to first aid competitions, turned up in first place last month in the first biennial First-Aid Contest in Charleston. Organized at Wharton No. 2 mine, Eastern Gas & Fuel Associates, only a few months ago, the five downed 57 other teams, many of them veteran competitors. Captained by J. C. Clark, the winners were Wandel Bickers, Harold Price, Lewis Perry, Adron Lyons (patient), and substitute Robert Green. Second place was won by Quinwood No. 3 mine, Leivasy, W. Va. Third place was taken by a team from Compass Coal Co. No. 2 mine, Phillippi, W. Va.

The Kaiser Coal Field near Raton, New Mexico, with unproved reserves of 4 billion tons, may be reopened within 1½ yr. Joseph Kastler, Kaiser's field manager in the area, says that "a large drilling program is already under way to block out vast tonnages." The manager says that the reopening is awaiting a go-ahead from Kaiser Steel Mills in Fontana, Calif.


JALTEN gives equal strength with lighter weight. Jalten steel plates go well with a weld.
Pre-heating is unnecessary with Jalten—even the weld is a factor in fatigue resistance

Low alloy, high strength Jalten offers good formability coupled with excellent corrosion and abrasion resistance

Jalten's high strength permits high design loads. It also permits a reduction in section when used to replace mild steels. Usually the reduction amounts to two gages affording a weight savings of approximately 25 per cent. Thus, dead weight can be eliminated—resulting in increased carrying capacity. Also, it is easily welded.

Jalten is furnished in four grades:

No. 1—possesses high strength, good formability and fabricating qualities—good resistance to low temperature impact.

No. 2—offers high strength, moderate formability—improved resistance to atmospheric corrosion.

No. 3—gives high strength—improved resistance to abrasion.

No. 4—provides superior formability and surface quality for bumper stock applications requiring plating.

Jalten Steels are available as sheets, strip, plates, structurals, bars and small shape sections.

SEND FOR THIS NEW BOOK:
Chemical properties of Jalten
Mechanical properties of Jalten
Jalten equivalents
Jalten application data

Jones & Laughlin
STEEL CORPORATION · PITTSBURGH

J&L STEEL

Why is P&H *of the*

MAGNETORQUE* and ELECTRONIC the only modern

These revolutionary advances in design and performance of electric shovels are just two of the reasons why operators and owners are pointing to P & H for their outstanding achievement in electric shovels . . . why P & H now is at the head of the Big Three . . . why P & H can promise you the only modern electric shovel.

Just think! Power transmission *without friction's* in massive electric shovels. Boosts efficiency. Cuts maintenance and operating costs. *This is Magnetorque.* Exclusive with P & H.

Just think! Complete control of dig, hoist, swing and propel of these giants with simple stepless control. 12% faster cycles; 16% savings in operating time. *This is Electronic Control.* Exclusive with P & H.

For complete information, call your P & H representative. Electric Shovel Division, Harnischfeger Corporation, Milwaukee 46, Wisconsin.

For Modern Engineering, Look to

HARNISCHFEGER

P&H

ELECTRIC SHOVEL DIVISION

at the head Big Three?

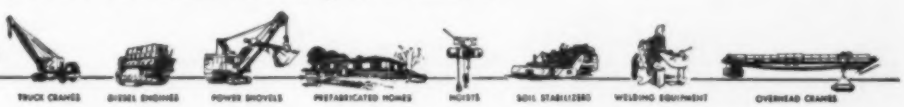
CONTROLS give operators electric shovels

For a clearly illustrated description of Magnetorque* and how it sets a new standard for electric shovel design and operation, write for Bulletin X-156. Other booklets available on electric shovel models from 3 to 10 cu. yd. capacity. A copy of these publications will be sent those who request it on their company letterhead.

*T. M. of Harnischfeger Corp. for Electro Magnetic Type Coupling

CORPORATION *Milwaukee 46, Wisconsin*

the P&H *Line*



Here's the SCHROEDER 3 way maintenance control system for IMPROVED HYDRAULIC OPERATION

1 *REDUCE the need for repair—*

Schroeder Hydraulic Filter Buggy

Removes troublesome dirt before it can gum up your hydraulic system. Saves oil, cuts pump and system repair costs.

2 *LOCATE trouble at the machine—*

Schroeder Portable Hydraulic Circuit Tester

Does away with time-consuming hunting by quickly pinpointing the trouble spot before removing any component from the machine.

3 *TEST to prove repair—*

Schroeder Hydraulic Test Bench

Removes all guesswork—now you can be sure of the condition of each hydraulic component before it is returned to the machine.

For a smoother flowing hydraulic system use the Schroeder 3 way maintenance control system.

SCHROEDER BROTHERS
CORPORATION
3116 PENN AVENUE
PITTSBURGH 1, PA. EXpress 1-1571
HYDRAULIC, ELECTRIC & PNEUMATIC EQUIPMENT

Foreign News

GREAT BRITAIN

On October 17, in a small village on the northwest coast of England, the curtain rose on the age of nuclear power. On that date, with all the pomp and ceremony that Britain reserves for historic occasions, the Queen threw a switch to send electricity into the national grid from the world's first nuclear power station of any real size. Calder Hall is the first step in a 20-yr atomic power program that Britain hopes will provide enough electricity to save 20 million tons of coal—the amount by which her estimated coal production will fall short of estimated consumption during the next 15 to 20 yr. This means that nuclear power could be providing about 20% of the United Kingdom's annual electricity output by 1975.

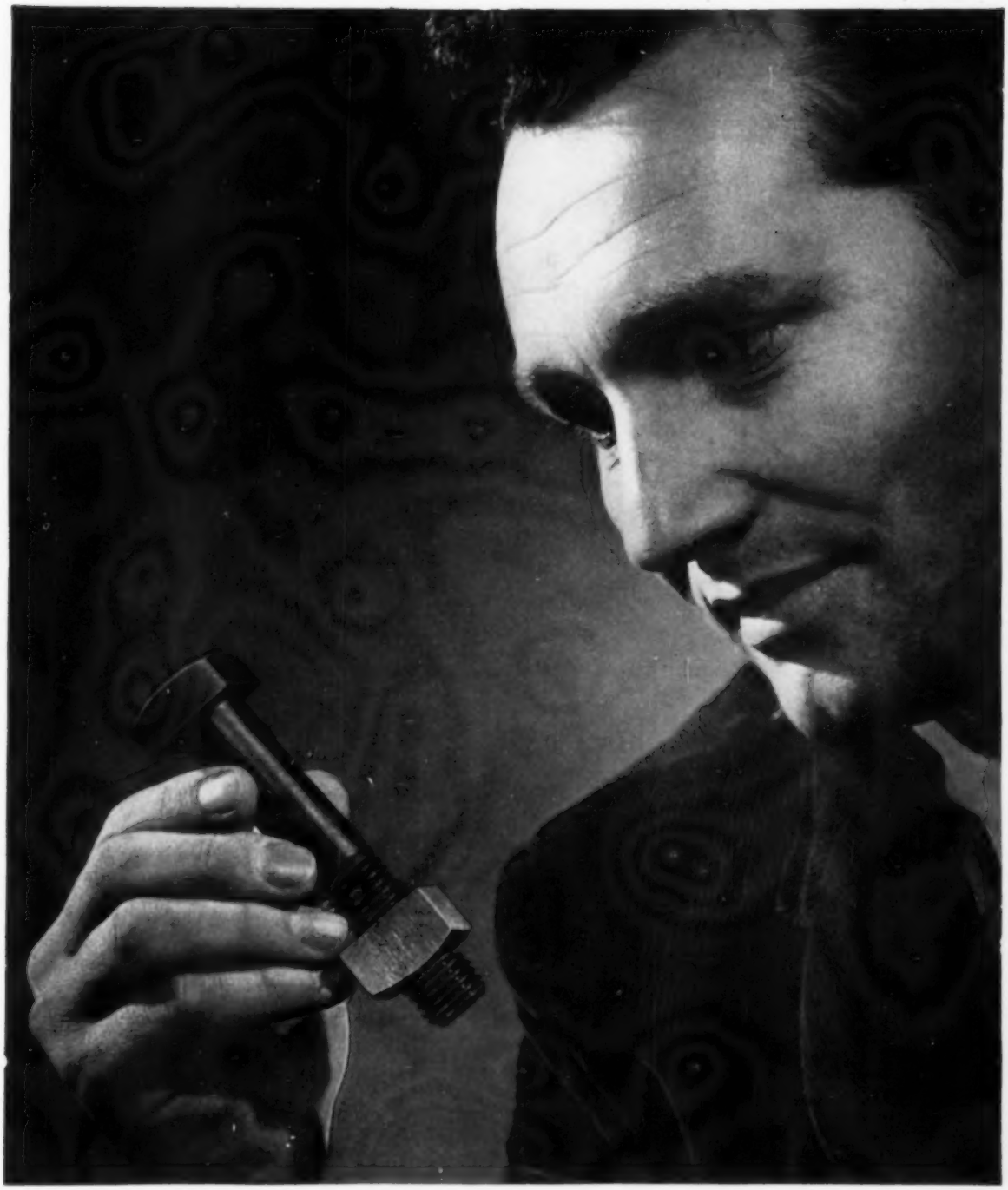
Calder Hall is only a prototype and an admittedly inefficient one. Its primary purpose is to produce plutonium. The generation of electricity is a by-product. But it is the first nuclear power station in the world to produce electricity for national use. Natural uranium is the fuel being used in the two reactors at Calder Hall. In operation, 20 tons of carbon dioxide circulate under a pressure of 100 psi from the reactors' hot cores to four heat exchangers surrounding the reactors. In these exchangers, water drawn from the river Calder is converted to steam. From this point on Calder Hall is a completely conventional power station. The steam from each reactor feeds two standard turbo alternators, each rated at 23,000 kw. In all, the four alternators produce 92,000 kw, or the equivalent of a medium-sized conventional power station. Estimated building cost of the station is $56 million, an amount met by the government through the Atomic Energy Authority. The AEA estimates generating costs at between seven mils and five mils per kilo watt hour. Even with home-produced coal at $11.20 a ton—the cheapest in Europe—the best of Britain's coal-fired stations cannot do better than seven mils. This does not take into account the fact that some of Britain's coal is imported from the United States at $28 a ton.

In London, Dr. W. Idris Jones, the National Coal Board's director-general of research, says that coal can be conveyed from a coal face to a pit head by pumping it through pipes with water. Says Dr. Jones: "In theory the whole output of the largest colliery in Britain could be pumped up the shaft through quite a small pipe." The problem of dust suppression would be eased enormously, but most important, he adds, new pipelines could be sunk from the surface to points near the coal face as it advanced, thus simplifying underground transport considerably.

Britain's National Coal Board, which entered the tramp shipping charter market in mid-September for the first time this year, has begun to fix tonnage for transatlantic coal carriage during the first 4 mo of 1957. The NCB is arranging for one cargo of United States coal each month between January and April and is paying $10.08 per ton, basis U. S. to Antwerp, Rotterdam, or Amsterdam, with 19¢ to $1.19 per ton for carriage to United Kingdom ports. Shipbrokers on the Baltic Exchange believe that this may be the beginning of a new major chartering program by the National Coal Board.

HUNGARY

This country will turn to nuclear energy for electric power between now and 1965 because of limited coal, oil and hydro-power reserves. The government in Budapest has decided to begin construction of a 100- to 200-mw power plant during 1957. The per-capita quota of Hungarian coal reserves amounts to 5% of the European average. At the same time Hungary is exploiting its reserves at high speed. Both the limited reserves and the overly fast exploitation



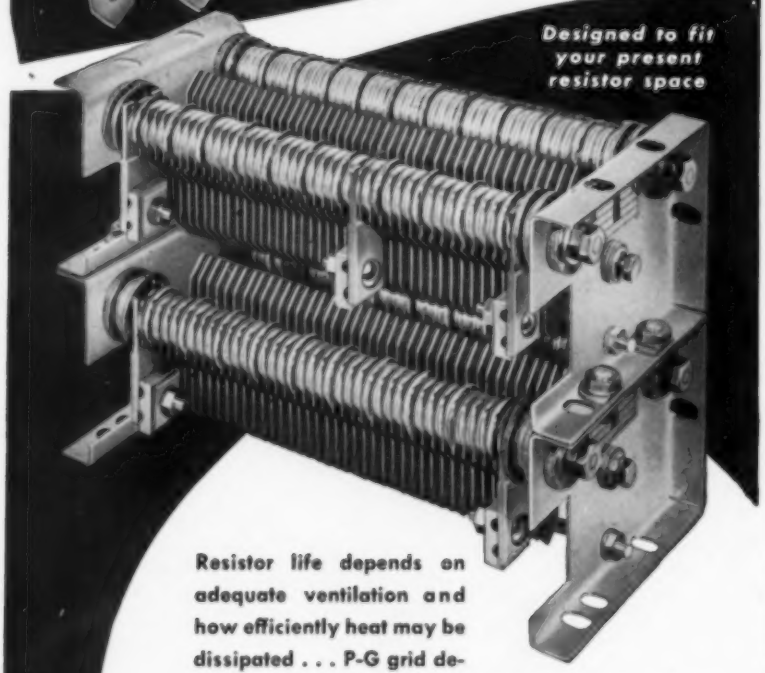
"Bethlehem Machine Bolts have really got it. Strong heads. Well-formed threads. Variety of styles. What more could we ask?"

Spikes and track bolts, too!

BETHLEHEM STEEL

Resistor life depends on adequate ventilation...

Patented P-G Grid Design assures maximum ventilation



Resistor life depends on adequate ventilation and how efficiently heat may be dissipated . . . P-G grid design equalizes the amount of air space surrounding each leg or loop to obtain even heat throughout the grid area. (Note illustration.) . . . Since heat is rapidly and evenly dissipated, hot spots fail to develop and longer resistor life is assured . . . For a nonbreakable resistor (only steel and mica used) specify P-G on your next application.

P-G *The Nonbreakable Steel Grid Resistor*

THE POST-GLOVER ELECTRIC COMPANY

•ESTABLISHED 1892•

221 WEST THIRD STREET, CINCINNATI 2, OHIO

Foreign News *(Continued)*

will lead Hungary to the point where, in about 10 yr, a severe shortage of primary energy will exist.

NORTHERN RHODESIA

For 3 yr, as a result of the inability of Rhodesia's railways to transport enough coal 800 mi from Southern Rhodesia to Northern Rhodesia's copper mines, copper belt operators have been burning costly substitutes (*Coal Age*, July, 1956, p 130). Last month some relief turned up when 20 megawatts of hydroelectric power began flowing to Northern Rhodesia from the Le Marinel Hydro Electric Power Station on the Lualaba River in the Belgian Congo. This is the first exchange of power between different countries on the African continent. The power line carries 220,000 v. Money for the scheme was provided by the Export-Import Bank, Washington, D. C., with the United States government backing the venture up to $22.4 million. Actual financing, however, was handled by Rhodesia and the Belgian Congo. Despite the power relief nobody sees a reduction in the copper belt demand for coal, large tonnages of which will still be required.

JAPAN

An influential Japanese business organization, the Industrial Planning Council, has recommended to the government that petroleum replace coal as the main source of Japan's energy. The Council attributes the nation's weak competitive power in world markets to expensive energy sources, notably high-priced coal. The Council asserts that petroleum is stabilized in both price and quality.

INDIA

Three thousand striking coal miners were reportedly using poison arrows and spears in a clash with police in northeast India last month. The poison arrow and spear attack occurred when police went to the rescue of non-striking miners. One striker was killed and six injured during the fight. Some police were reported injured. About 50 000 miners have been on strike since Sept. 17 at 26 British-owned collieries.

ITALY

Plans to import 2.9 million tons of coal in the fourth quarter this year have been approved by the Ministry of Industry Coal Committee. The imports will come from at least 10 sources, in addition to the European Coal & Steel Community.

NORWAY

225,000 tons of coal have been mined this year at Spitzbergen, Norway's Arctic possession. Most of it is being kept for home use.

How Bucyrus-Erie Bonus Quality Helps You Cut Costs, Increase Output

This is the Bucyrus-Erie 38-B shovel that won praise from its owner in this stripping operation near Oliver Springs, Tenn.

To discover the real advantages of Bucyrus-Erie *Bonus Quality* put a Bucyrus-Erie shovel to work in your pit. That's what Chas. Walls and Sons, Oliver Springs, Tennessee did.

Walls' job was to strip four feet of sandstone and 25 feet of shale and dirt to get at the coal in a mine near Oliver Springs, Tenn. The complete job involves excavation of 1,200,000 yards of overburden. After putting a Bucyrus-Erie 1½-yd. 38-B to work for a year, Walls commented, "Excellent service, strongest built of any shovel of its rated capacity."

"Strongest built" is just a part of the advantages of *Bonus Quality*. Not only do you get design and construction that adds years of life and keeps maintenance costs low, but there's extra performance value, too. There is high-speed operation that delivers big output. There is dependability that *keeps* big output coming day after day.

When you plan to add a shovel to your operations, be sure to get the story of *Bonus Quality* from your Bucyrus-Erie Distributor. Remember to see him soon. 243E56

Bonus Quality Bucyrus-Erie uses highest quality steel, then flame hardens it to bring you gears and pinions that wear long, keep costs low.

BUCYRUS ERIE

South Milwaukee, Wisconsin

1 Scene: Hoffman Bros. & Wilson Quarry, Harrisburg, Pa. Blast, using Atlas AMOCORE with Giant Gelatin primer, is initiated at bottom of holes. Propagation excellent, despite water in holes.

Lower your blasting costs
gain better digging

Get sure-shots like this

2 37 ft. quarry face erupts in well controlled heave, with minimum noise and vibration.

3 Well formed muck pile—9,661 tons of limestone rock—is ready for easy digging.

with AMOCORE

No matter how low cost a blasting agent may be, its economy can only be measured by effectiveness of the blast.

Dependable Atlas AMOCORE, an economical blasting agent of ammonium nitrate and carbonaceous material, affords true savings far beyond its low price. Properly used with ROCKMASTER® blasting methods, AMOCORE provides sure shots with maximum breakage, well controlled throw, minimum noise and vibration.

Its continuous gelatin core assures a better order of detonation through any length column—initiation at bottom or any point you choose. The *convenient fluted-end cartridges* permit easy loading in both horizontal and vertical holes.

AMOCORE is available in high, medium or low velocity. It is one of a complete line of Atlas Explosives and Blasting Agents. Get full details from your Atlas representative. And write for "*Better Blasting*," Atlas' informative newsletter on latest methods and materials.

EXPLOSIVES DIVISION

ATLAS POWDER COMPANY

WILMINGTON 99, DELAWARE

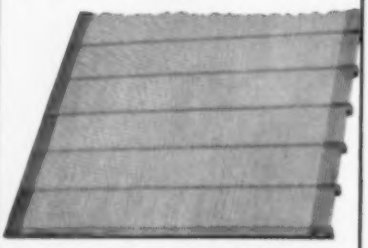
offices in principal cities

Buy Valuable long life and economy that you can actually SEE...

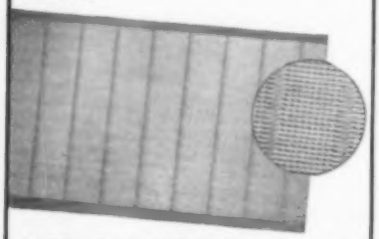
Reg. U.S. Pat. Off.

Kleenslot

Wedge Wire Preparation Screens



WEDGE WIRE ALUMINUM SCREENS: They have all the attractive and sturdy features of many other metals besides aluminum and offer a flexing action that adds capacity and dewatering abilities which are almost unbelievable. It gives a distinct advantage where vibration is prevalent.



MARCEL TYPE SCREEN! This screen, as all WEDGE WIRE products, gives long life and non-blinding operation. Maximum dewatering efficiency is combined with a wavy type of screen preventing objectionable slivers passing through. This keeps the end product uniform.

Wedge-Wire CORPORATION

Gas Street at Nickle Plate R. R.
Wellington, Ohio

Personal Notes

H. P. Greenwald

Harold P. Greenwald, director of Region 5, U. S. Bureau of Mines, retired Oct. 31 after 45 yr of federal service. As a regional director, Mr. Greenwald was in charge of USBM operations in states east of the Mississippi River and in Minnesota and Iowa. Under his direction fundamental research had been conducted in coal, synthetic liquid fuels, explosives, iron and other minerals. He also compiled and published production data from his headquarters in Pittsburgh. Mr. Greenwald was appointed regional director in 1949 after the Bureau was reorganized into geographical sections. Before the appointment, he served 13 yr as superintendent of the Central Experiment Station, Pittsburgh. Before that he had been supervising engineers of the USBM experimental coal mine in Bruceton, Pa. He has played an active role in developing and directing various research and experimental projects connected with better utilization of coal for steel production and other purposes.

With the announcement that it had dissolved the Princess Dorothy Coal Co., Twilight, W. Va., as a subsidiary and renamed the property the Robin Hood mine, Armco Steel Corp. also announced these personnel changes: **C. O. Kane,** manager of mines, with offices at Montcoal, W. Va., will head the operation of Robin Hood along with those of No. 1 and No. 7 mines, Montcoal. **James Trusley,** formerly superintendent of the Nellis mine, has been appointed superintendent of the Robin Hood mines with headquarters at Twilight. **Elvin Miller,** former industrial engineer at Montcoal, has been named assistant to the superintendent at Robin Hood. And **Green Clendenin,** on temporary assignment at Robin Hood, has been named general foreman of No. 7 mine, Montcoal.

H. H. Cobb has been appointed assistant to Eastern Gas & Fuel Associates' **Walter Rothenhoefer,** vice president, coal division. Mr. Cobb will take charge of shipping and statistics in the division's Pittsburgh headquarters.

William H. Ritter was elected president of the Central Pennsylvania Coal Producers Association and of the Eastern Bituminous Coal Association last month at a meeting of the organizations in Bedford Springs, Pa. Other officers: **Ralph H. Moore,** vice president; **Walter A. Jones,** treasurer; **C. P. O'Neill,** assistant treasurer; **Frank G. Smith,** counsel. **Robert T. Laing** was returned to the posts of executive director and secretary.

Oglebay, Norton & Co., Cleveland iron ore, coal and lake shipping firm, has announced these executive appointments: **A. K. Green,** formerly coal sales manager,

W. D. Hamilton

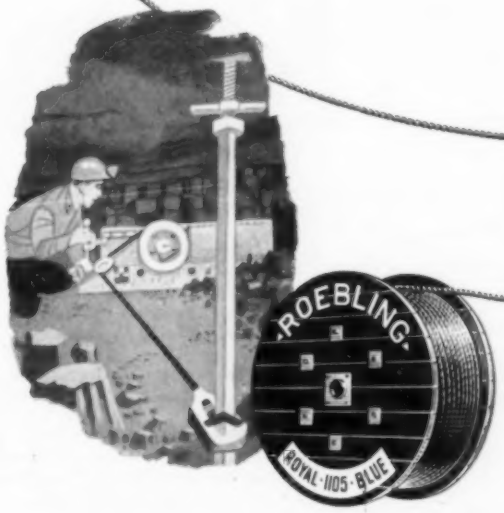
M. A. Williams

now vice president, coal sales; **W. D. Hamilton,** formerly coal mines manager, now vice president, coal operations; **M. A. Williams,** formerly general superintendent, coal mining, now general manager, coal operations. Among its operations, the company owns the Brule Smokeless Coal Co.

(*Continued*)

toughest

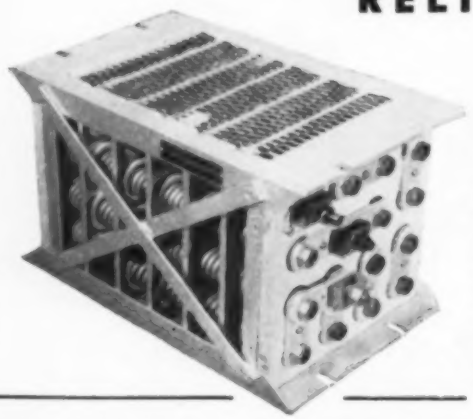
Royal Blue rope is made of the *toughest* rope wire ever developed... Roebling Type 1105



John A. Roebling's Sons Corporation, Trenton 2, N. J., Subsidiary of The Colorado Fuel and Iron Corporation BRANCHES: ATLANTA, 934 AVON AVE. • BOSTON, 51 SLEEPER ST. • CHICAGO, 5525 W. ROOSEVELT RD. • CINCINNATI, 2340 GLENDALE-MILFORD RD., EVENDALE • CLEVELAND, 13225 LAKEWOOD HEIGHTS BLVD. • DENVER, 4801 JACKSON ST. • DETROIT, 915 FISHER BLDG. • HOUSTON, 5216 NAVIGATION BLVD. • LOS ANGELES, 5240 E. HARBOR ST. • NEW YORK, 19 RECTOR ST. • ODESSA, TEXAS, 1920 E. 2ND ST. • PHILADELPHIA, 230 VINE ST. • PITTSBURGH, 1723 HENRY W. OLIVER BLDG. • SAN FRANCISCO, 1740 17TH ST. • SEATTLE, 900 1ST AVE. S. • TULSA, 321 N. CHEYENNE ST. • EXPORT SALES OFFICE, 19 RECTOR ST., NEW YORK 6.

LOCOMOTIVE RESISTORS

RUGGED-
RELIABLE



● Have ample resistance to start locomotives smoothly on the first point and sufficient capacity for long life. No special frame construction is necessary. Just mount the units in place and connect controller leads.

Write for GUYAN Bulletins. We supply a complete line of resistance products.

GUYAN MACHINERY CO. LOGAN W. VA.

COMMUNICATION and CONTROL

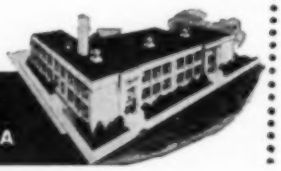
TROLLEYPHONES
Most widely used communication for underground haulage.

AUDIOPHONES
Finest communication between control points in cleaning plants.

CONTROLS
Save time and money by remote control of pumps, fans, sub-stations, etc.

Femco systems were first in the mines and are today first in quality and dependability.
Get the facts. Submit your problem for a proposal.

SALES AND SERVICE AGENCIES
National Mine Service Co., Beckley, W. Va.
Industrial Physics & Electronic Co., Salt Lake City, Utah



MANUFACTURED BY
Femco Inc. IRWIN, PENNSYLVANIA

Personal Notes *(Continued)*

Two appointments have been made to the staff of Bituminous Coal Research, Inc., by Dr. A. A. Potter, BCR president. The men are **Robert D. Saltsman,** former

R. W. Stephan

R. D. Saltsman

resident mining engineer for Youngstown Mines Corp., Dehue, W. Va., and **Robert W. Stephan,** a Pittsburgh chemical engineer. Mr. Saltsman is currently working on coal-burning equipment sized for commercial and small industrial application. His experience includes work in coal sampling for cleaning plants, experimental work on flotation, surveying, time study engineering and production engineering. Mr. Stephan has been assigned to projects tied to bench-scale investigations of catalytic gas phase oxidation of sulfur dioxide, in addition to surveying and evaluating methods of controlling sulfur dioxide emission in flue gases.

Lee Williams, Webster Springs, W. Va., has been appointed superintendent of Sharps Knobs mines, Maust Coal & Coke Co. Mr. Williams succeeds **K. D. Albaugh** who has taken a job as superintendent of a mine at Glenville, W. Va.

DOW

ANOTHER CARLOAD OF FROZEN COAL!

Reduce such complaints with Peladow

The customer is always right. And in most cases, his complaint can be multiplied. For many customers choose to remain closemouthed . . . and take their business elsewhere in silence.

Why risk losing customers when it's so easy to end frozen coal complaints with Peladow®, the high-test calcium chloride in buckshot-size pellets.

Spray it! Apply Peladow in a water solution as the coal comes off the boom or loading chute. *Sprinkle it!* Apply Peladow dry at any convenient point prior to loading. *Save with it!* Order Peladow in 100-lb. moistureproof bags, bulk hopper cars, bulk tank cars, or bulk trucks. Its high calcium chloride content (94 to 97% concentration) means four carloads equal five carloads of flake type. Save transportation, storage, and handling costs; apply it manually or mechanically.

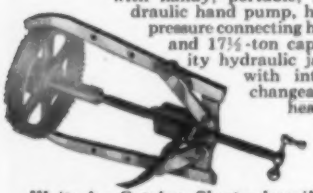
In addition, use Peladow to dust-proof coal and keep it clean, reduce dust in mines, firm up roads and haulage ways. Truly, an all-round product that offers advantages for both you and your customers! Get your copy of the Peladow Manual . . . write THE DOW CHEMICAL COMPANY, Dept. IN-783T-1, Midland, Michigan.

you can depend on DOW CHEMICALS DOW

ARMSTRONG-BRAY
HYDRAGRIP HYDRAULIC PULLERS

Valuable Maintenance Tool

With the handy portable HYDRAGRIP and a few ARMSTRONG-BRAY Pullers, you can quickly, safely and easily remove gears, wheels, bearings, sheaves or parts from shafts, can re-install them with equal ease. Single centered ram assures aligned thrust that moves parts along shafts smoothly without wedging or binding. Saves time, saves parts—ends battering and breakage. The HYDRAGRIP—comes complete with handy, portable, hydraulic hand pump, high pressure connecting hose and 17½-ton capacity hydraulic jack with interchangeable heads.



Write for Catalog Sheet—describes HYDRAGRIP and complete line of standard and special external and internal pullers.

ARMSTRONG-BRAY & CO.
5340 NORTHWEST HIGHWAY • CHICAGO 30, ILL.

Among the Manufacturers

Mine Safety Appliances Co., Pittsburgh, Pa., has formed the MSA Research Corp., a wholly-owned subsidiary, to carry out expanded programs in basic research. The subsidiary's staff will work in chemistry, physics and nuclear energy. Principal laboratories are situated at Callery, Pa.

The Calumet Steel Div., Borg-Warner Corp., has begun construction of a $200,000 office building in Chicago Heights, Ill. Occupancy is scheduled for March 1. Calumet manufactures various steel products for industrial use.

The Detroit Diesel Engine Div., General Motors, has expanded its administrative sales and service facilities with the establishment of regional operations in six cities—New York, Atlanta, Detroit, Chicago, Dallas and San Francisco. These regional managers have been named: L. A. Steele, New York; R. W. Phillips, Atlanta; J. C. Campbell, Detroit; D. E. Schwendemann, Chicago; Eric Sutton, Dallas; and R. L. Burpee, San Francisco.

W. J. Klein has been appointed vice president and director of sales for the Tractor Group, Allis-Chalmers Mfg. Co., Milwaukee, Wis. At the same time the company announced that W. L. Voegeli has been appointed general sales manager.

H. F. Knobloch has been named midwestern belting sales engineer for the conveyor and elevator belting department, United States Rubber Co. A former sales engineer in Passaic, N. J., Mr. Knobloch will work out of an office in Chicago.

The Macwhyte Co., Kenosha, Wis., manufacturer of wire rope, has appointed Russell J. Whyte field sales manager. Mr. Whyte will be responsible for all field sales activities conducted from Kenosha.

Jeffrey Mfg. Co. is opening a warehouse in Burlingame, Calif., to augment the stock of 17 distributors in 11 western states. Jeffrey's San Francisco sales headquarters also will be housed in the new structure, which will stock conveying and power transmission parts.

The Nelson L. Davis Co. is moving its main office and engineering department to 517 Main St., West McHenry, Ill. The company's mid-west sales offices are remaining at 343 S. Dearborn St., Chicago, Ill.

The Hydraulic Control Div., Blackhawk Mfg. Co., has formed Dynex, Inc., an engineering, manufacturing and sales organization, to operate in the hydraulic controls and circuits markets. Organized to manufacture a broad line of individual hydraulic components as well as to offer engineering advice on special hydraulic control problems. Dynex will serve manufacturers of construction and materials handling machinery and mining machinery.

W. W. Williams Co. has been appointed distributor in Ohio of Huber-Warco road machinery. Williams will sell and service motor graders and rollers from offices in Columbus, Cleveland, Cincinnati, Maumee and Cadiz.

Richard G. Schaal has been named manager of the Mine Hoist Dept., Mine, Crusher & Process Machinery Div., Nordberg Mfg. Co. He succeeds the late Ted C. Wiedenhoefer.

Donald E. Alworth has been appointed service engineer for the Rocky Mountain region of the Allis-Chalmers Industries Group, Denver, Colo.

National Carbon Co., New York, N. Y., has announced three appointments: A. W. Wolff has been named manager of carbon specialty sales and will make Cleveland his headquarters; R. L. Westlake has been appointed manager of the central division of the carbon products sales department in Chicago; and J. W. Scales has been named manager of the mid-

Knowing the facts . . .
you'll choose Neff & Fry Bins

Super-Concrete Staves—virtually as hard and dense as natural stone—comprise the walls of Neff & Fry Bins (silos). The edges are tongued and grooved. The ends are diagonal so that surrounding hoops will impinge directly upon the horizontal joints.

Each stave is 10″ wide x 30″ long x 2½″ thick. Note particularly the thickness. It means a Neff & Fry Bin has great interior capacity in relation to external diameter. It also means a substantial saving of cement compared to that used in thick-walled concrete bins.

Because the staves have crushing strength of up to 8,250 psi, Neff & Fry bins carry heavy superstructures without additional supports—and that can save a large amount of construction cost.

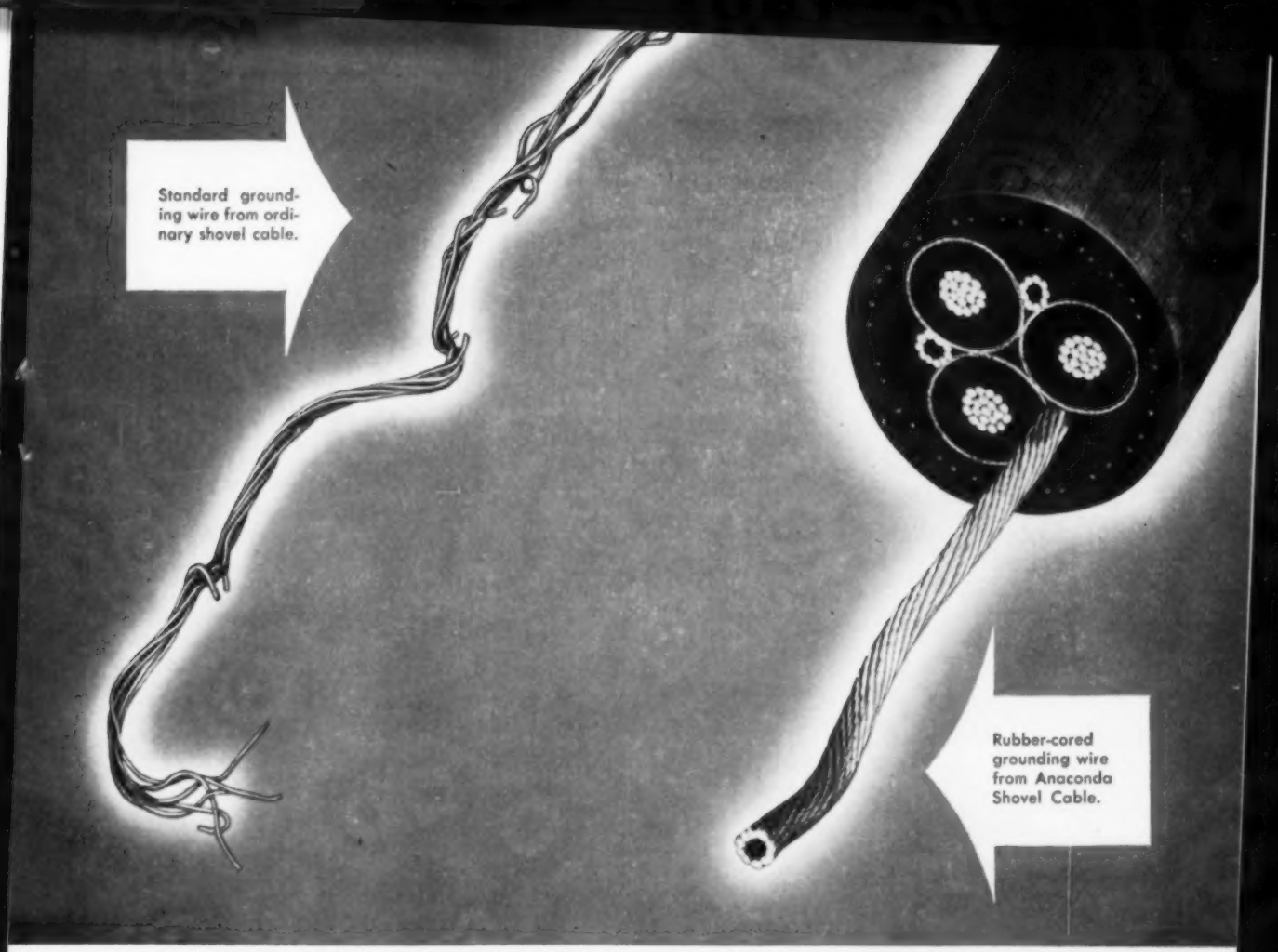
Neff & Fry Bins don't rot, rust, spall, or burn. They never need face-lifting.

And these are just a few of the facts. If you knew them all, you'd certainly choose Neff & Fry Bins when you need facilities for handling and storing any kind of flowable bulk material. Ask us for complete information.

Not exported except to Canada and Mexico.

THE NEFF & FRY CO.
228 ELM STREET • CAMDEN, OHIO

SUPER-CONCRETE STAVE STORAGE BINS

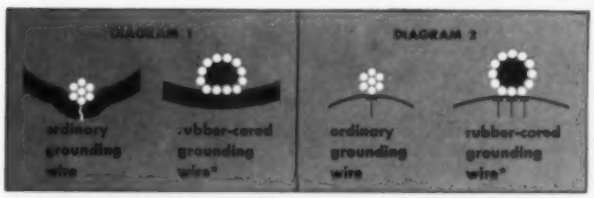


PHOTOGRAPH of grounding wires from actual cables. Note how wires in ordinary shovel cable have kinked and broken in service – while Anconda's patented rubber-cored grounding wires show no sign of damage.

Look how Anaconda's rubber-cored grounding wires

keep cable on the job and out of the shop

When shovel cable is moved in mining operations, ordinary grounding wires tend to move within the cable—to kink and break during bending, as the actual sample on the left shows.



LARGER DIAMETER of Anaconda's rubber-cored grounding wire, unlike ordinary grounding wire, will not cut insulation if cable is crushed (diagram 1). In addition, it provides broader contact with the shielding, provides a more positive ground (diagram 2).

*Patented by Anaconda

In contrast, Anaconda's patented rubber-cored wires, right, conform more readily when compressed or bent. Every wire in every strand is cushioned. No kinks or breaks occur.

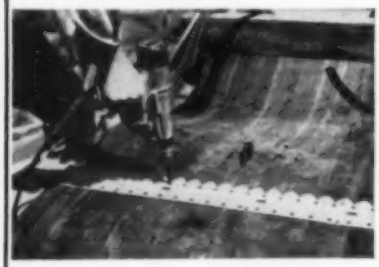
Rubber-cored grounding wires also have larger diameters—this provides (1) broader contact and shielding and (2) reduces tendency of the ground wires to cut the individual wires in both the shield and the grounding wire.

The only shovel cables made with rubber-cored grounding wires are made by Anaconda. For more information, call the Man from Anaconda or see your Anaconda distributor. Anaconda Wire & Cable Company, 25 Broadway, New York 4, N. Y.

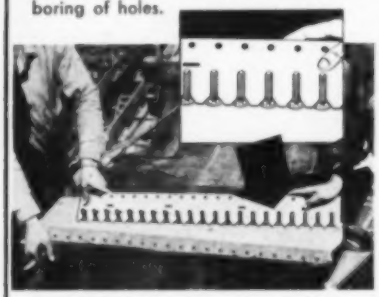
ASK YOUR ANACONDA® DISTRIBUTOR ABOUT SHOVEL CABLE

NEW
FLEXCO
POWER TOOLS
CUT APPLICATION TIME IN HALF

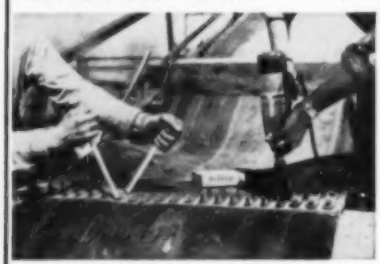
Your two man belt team can now join a belt 30" wide in 15 to 20 minutes . . . using the new FLEXCO Power Tools.



The FLEXCO Power Tool Boring Bit used with electric or air impact tool speeds boring of holes.



New FLEXCO Templet positions bolts for quick joining of belts. Reaching under belt has been eliminated.



Running down nuts is fast with the new FLEXCO Power Wrench used with electric or air impact tool. Two Bolt Breakers are used together to complete the joint.

If you are interested in speeding up fastener application, order the new Power Tools from your local FLEXCO Distributor. Write for Bulletin F-112-A.

FLEXIBLE STEEL LACING CO.
4638 Lexington Street • Chicago 44, Illinois

Manufacturers *(Continued)*

eastern division of carbon products sales department in Pittsburgh.

Wilbur H. Peter, Jr., has been elected a vice president of Square D Co. and division manager of the company's Electric Controller Div., Cleveland, Ohio. Mr. Peter succeeds Alvin C. Dyer, retired.

Bird Machine Co., South Walpole, Mass., has appointed Calvin A. King assistant to the president. The company has also announced the appointment of Henry H. Shepherd as general sales manager. Bird builds the Bird coal filter and the Bird-Humboldt centrifugal coal dryer.

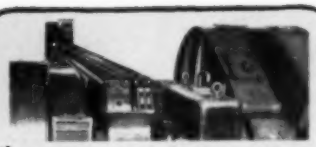
Wesley H. Raff has been appointed chief engineer of the Robin Engineers Div., Hewitt-Robins, Inc. Mr. Raff succeeds Henry F. Dischinger, retired. Mr. Raff joined Hewitt-Robins in 1926 as a structural engineer. Since then he has served as construction engineer, contract engineer and consulting engineer. Mr. Dischinger had been a member of the Hewitt-Robins engineering organization since 1918. During his career he designed and engineered hundreds of conveyor systems for handling coke, coal, and other bulk materials. In 1926 he was appointed manager of the company's engineering organization in Chicago. A move to New York in 1941 resulted in an appointment by 1945 as chief engineer.

Fred R. Wilson, manufacturing director of du Pont's Explosives Dept., has been appointed director of sales of the department. He succeeds **George H. Loving,** who has been appointed assistant general manager, Photo Products Dept.

Burndy Engineering Co., Inc., has changed its name to Burndy Corp., Marvin Lee, executive vice president has announced. The Norwalk, Conn., company manufactures electrical connectors and installation tooling. The name was changed to "reflect the broadening of the organization's activities."

Theodore R. Zatkovich has been transferred from Pittsburgh to Chicago as B-I-F Industries' district sales manager. Mr. Zatkovich will take charge of industrial and municipal sales of meters, feeders, and controls manufactured by B-I-F.

Joy Mfg. Co. has established three new general management positions at the vice presidential level: Hugo C. Nyquist was named to the newly created post of vice president and general manager of Joy's Coal Machinery Div.; James A. Drain was named vice president and general manager of the Construction Div.; and Louis G. Helmick was appointed vice president and general manager of the Industrial Div. In his new post Mr. Nyquist will be responsible for research, engineering, manufacturing, and sales of Coal Machinery Div. products. Mr.



"THIS LUBRICANT ENABLED US TO INCREASE PRODUCTION"
says—PITTSBURGH TUBE COMPANY

"Our 70,000 pound Draw Bench was designed to operate at a maximum of 80 feet per minute, full load. We decided to increase the drawing speed on lighter tubing to 100 and 104 feet per minute. This overloaded the Speed Reducer, however, causing it to overheat. We tried four different makes of oils without success before trying LUBRIPLATE A.P.G. 90. With LUBRIPLATE, we are able to pull heavier tubing than before at 104 feet per minute without the Reducer overheating."

R. S. Vorous
Maintenance Engineer

REGARDLESS OF THE SIZE AND TYPE OF YOUR MACHINERY, LUBRIPLATE LUBRICANTS WILL IMPROVE ITS OPERATION AND REDUCE MAINTENANCE

LUBRIPLATE LUBRICATION
MAKES CARS AND TRUCKS RUN BETTER AND LAST LONGER

LUBRIPLATE H.D.S. MOTOR OIL . . . THE OIL THAT NEEDS NO ADDITIVES

For nearest LUBRIPLATE distributor see Classified Telephone Directory. Send for free "LUBRIPLATE DATA BOOK" . . . a valuable treatise on lubrication. Write LUBRIPLATE DIVISION, Fiske Brothers Refining Co., Newark 5, N. J. or Toledo 5, Ohio.

Every winter, more and more progressive operators are treating their coal with Sterling Rock Salt. This modern practice builds good customer relations by preventing shipments from freezing...speeds turn-around of cars.

Here are some other important reasons why *you* should use economical Sterling Rock Salt this winter: Sterling Rock Salt is simple to apply, handles easily, is harmless to hands and clothing, stores without loss. And it dissolves slowly, to give long-lasting antifreeze action. You can also use Sterling Rock Salt to prevent frozen scales and switches . . . and to keep roads and yards clear throughout the winter. It removes snow and ice *fast*.

Order Sterling Rock Salt now—regular or "Inhibium Treated" to prevent corrosion of metal equipment. International's strategically located mines are ready to give you fast shipments in bulk, or handy 100-lb. bags.

INTERNATIONAL SALT COMPANY, INC., SCRANTON, PENNA.

Sales offices: Atlanta, Ga.; Chicago, Ill.; New Orleans, La.; Baltimore, Md.; Boston, Mass.; Detroit, Mich.; St. Louis, Mo.; Newark, N.J.; Buffalo, N.Y.; New York, N.Y.; Cincinnati, O.; Cleveland, O.; Philadelphia, Pa.; Pittsburgh, Pa.; and Richmond, Va.

NEWCOMER
CARBIDE
MINING TOOLS
for greater
production...
EVERYWHERE!

NEWCOMER CARBIDE and CARBIDE MINING TOOLS are made in one plant specializing in Controlled Quality Carbide and Carbide Tools.

NP MACHINE BITS

Designed with a durable alloy steel shank, heat treated to withstand considerable abuse, and properly shaped NP Controlled Quality Carbide Tips that give maximum cutting with minimum power consumption.

NP DRILL BITS

The drill with the twist that counts ... developed through intensive research to commercially produce a drill head combining the exceptional wear resistance of NP Cemented carbides with the free-cutting, non-clogging features of the old style twisted steel bit.

NP ROOF DRILL BITS

Extremely satisfactory in use even under abnormal conditions. Available in both slotted and solid spade types. Tipped with NP Controlled Quality Carbide, these bits assure faster drilling with less feed pressure than normally required.

Send today for Mining Tool Catalog MT-553

NEWCOMER PRODUCTS, INC.
Latrobe, Pa.

General Sales Office:
512 Franklin Ave., Pittsburgh 21, Pa.
Other sales offices in principal mining areas.

Manufacturers *(Continued)*

Nyquist will be responsible for research, engineering, manufacturing, and sales of Coal Machinery Div. products. Mr. Nyquist joined Joy in 1946 as district manager in Forty Fort, Pa. He also served as manager in Huntington, W. Va. In 1950 he was made vice president of coal machinery sales. In 1956, he was made vice president of general sales.

Hewitt-Robins, Inc., rubber and machinery products manufacturer, is establishing a warehouse and sales office in Fort Washington Industrial Park, Fort Washington, Pa. The new building will be headquarters for the company's Philadelphia district, now situated in Philadelphia. Stocked products will include conveyor belting, industrial hose, vibrating screens and conveyor machinery.

Frank G. Hough, founder and president of the Frank G. Hough Co., Libertyville, Ill., was elected chairman of the board of directors last month during a special meeting of the board. The post is a newly-created one, for which Mr. Hough has relinquished the job of president to G. A. Gilbertson, formerly executive vice-president and general manager. As the new president of Frank G. Hough Co., Mr. Gilbertson also acquires the title of chief operating officer.

Books For Coal Men

Bituminous Coal Trends—1956, is the successor publication to Bituminous Coal Annual, the sixth and final edition of which was published in 1953. The book reports developments in coal in the United States and elsewhere with respect to energy requirements, markets, production, labor, safety, research and reserves. Statistical tables are based upon 1946-55 decade. Also included are directories of coal-industry organizations, local coal-operator associations and National Coal Association officers. *6x9-in; paper; National Coal Association, Washington, D. C.*

Mining in Art

Mining and the Arts Through the Ages include 11x15-in reproductions of the most characteristic works of art exhibited in *Paris on the Centenary of La Societe de L'Industrie Minerale.* The book also includes a series of paintings on continuous mining that appeared in *Fortune. $14, M. N. Barbier, c/o French Mining Equipment, 35 Wisconsin Circle, Chevy Chase, Md.*

Rocks

Classification of Rocks, by Dr. R. B. Travis, is a revised edition that describes rocks on the basis of visible features, using terms and conventions generally accepted at present. Charts and photographs. *$1, Department of Publications, Colorado School of Mines, Golden, Colo.*

Books *(Continued)*

Mathematical Tables

The following expanded and revised series of tables are available from C. K. Smoley's & Sons, Inc., Box 14, Chautauqua, N. Y. All are 7x4¾-in; cloth.

Parallel Tables of Logarithms and Squares. *688 pp. $6.*

Five Decimal Logarithmic Trigonometric Tables. *200 pp. $1.50.*

Parallel Tables of Slopes and Rises. *532 pp. $6.*

Three Combined Tables (Above three books in 1). *1,124 pp. $10.*

Segmental Functions. *436 pp. $5.*

Four Combined Tables (All 4 books in 1). *1,424 pp. $12.*

Safety

Accident Facts contains facts and figures on all types of accidents. Twenty pages are devoted exclusively to occupational accidents and provide background material for an industrial safety program. Charts show accident rates by major industry groups and trends during the last 30 yr. *96 pp. $1, National Safety Council, 425 N. Michigan Ave., Chicago 11, Ill.*

Roof Bolting

Haulage Ways, September issue, offers up-to-date information on roof-bolting techniques, including materials, installation procedures, safety checks, and pull tests. *20 pp. Free on request, Ohio Brass Co., Mansfield, Ohio.*

Standards

List of American Standards contains 1,600 American standards, of which 19 are for mining. They cover safety equipment, procedures and other specifications concerning mines and quarries. *56 pp. Free, American Standards Assn., 70 E. 45 St., New York 17, N. Y.*

Dollar Savings Through Standards highlights economic benefits to American industry resulting from the use of standards. *40 pp. American Standards Assn., 70 E. 45 St., New York 17, N. Y.*

The following publications by the U. S. Bureau of Mines may be obtained free upon request to Publications-Distribution Section, 4800 Forbes St., Pittsburgh 13, Pa. All are 8x10½-in; paper; mimeo.

Physical Properties of Mine Rock, by Bryon E. Blair, *Part III, R. I. 5130; Part IV, R. I. 5244.*

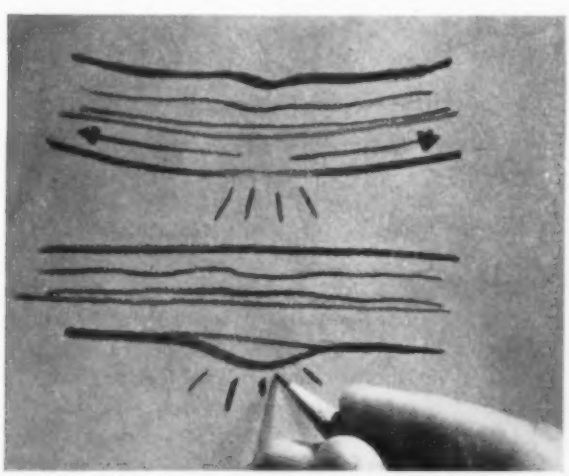
A Study of the Air and Rock Vibrations Produced by Impact Testing of Mine Roof, by Powell N. Summerfield. *R. I. 5251.*

Safety with Solvents, by H. B. Humphrey and Genevieve Morgis. *I. C. 7757.*

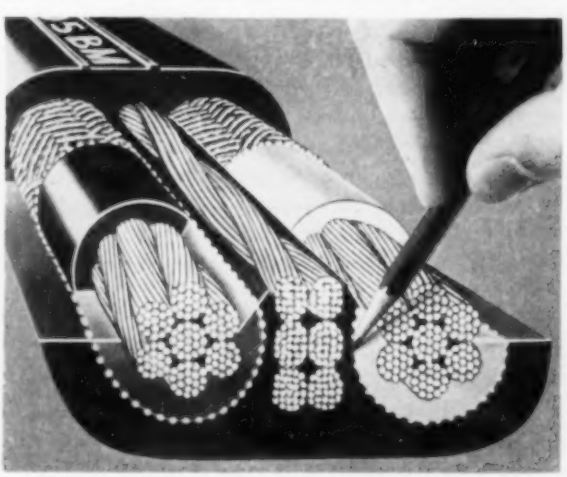
Rome's shuttle car cable can't be bent the wrong way!

JUST *TRY* TO BEND IT THE WRONG WAY. Force a length of Rome 60 Parallel Duplex to bend along its major axis—*if you can!* You'll discover that you can't put a damaging wrong-way bend in this tough cable—and neither can obstructions on the floor of your mine.

NO DAMAGING BEND—JUST A *FLIP-OVER.* When flexed in use, Rome's Duplex flops over and bends on its minor axis. Its interlocked construction forces the change and causes a flip-over, not a breakdown. This means that the power keeps coming through, and your coal production remains high.



WHAT HAPPENS TO *OTHER* CABLES. Wrong-way bends on ordinary shuttle car cables often cause conductors to slip, causing distortion. One side of the cable may stretch, the other crimp. Result: *a weak spot*. Further flexing, tension, or twisting turns the weak spot into a breakdown. Coal production then falls behind.



WHY ROME'S DUPLEX BENDS THE RIGHT WAY. Open braid around each insulated conductor forms a crisscross tread-like surface—one that won't slip. The tough Neoprene jacket and braided conductors, meshed together, bend just one way. The interlocked construction assures the right bend, and power keeps coming through.

Send for your FREE sample! Put a two-foot sample length through this same test yourself. See how Rome 60 Parallel Duplex simply can't be bent the wrong way. Ask your nearest Rome Cable representative for your free sample—or write to Department 502-B, Rome Cable Corporation, Rome, New York.

ROME CABLE
CORPORATION

THE SHORTAGE OF SCIENTISTS AND ENGINEERS:

What Caused It?

WHY is the United States confronted with a serious shortage of scientists and engineers?

One reason, discussed in earlier editorials in this series, is that the increasingly complex technology needed for national security and for an expanding economy has raised enormously the demand for technically trained people.

But it is clear also that too little has been done to increase the supply of scientists and engineers and to make most effective use of the limited number now available. It is with this second reason for the shortage that this editorial deals.

Too few bright young people have been attracted to careers in the sciences and engineering. Many with technical training have been leaving these professions, with the exodus from teaching being especially alarming. And the technical talent now employed in industry, government and education is, in too many instances, being utilized less effectively than it might be.

Paying for a Miscalculation

A legacy of the depression provides part of the explanation for the current shortage of young people entering scientific and engineering careers. Because of low birthrates in the 1930s, there are now about one million fewer boys and girls of college age than there were in the early 1940s. Not until 1960 will there be as many in the 18-21 age group as in 1945. And from the brightest young people of these ages must come, not only scientists and engineers, but the new members of all the professions needed by our growing economy.

A miscalculation in the late 1940s, when our future needs in various occupations were being gauged, provides another part of the explanation. Occupational counselors and high school students were advised that, because of heavy postwar enrollments in engineering and other technical fields, "it is likely that the shortages of trained men will be alleviated in a few years."*

Instead of being alleviated, however, the shortages became more acute. Job opportunities grew rapidly, while graduating classes dwindled. Fewer than half as many students received degrees in engineering in 1955 as in 1950, the peak postwar year. The trend has been reversed, but graduating classes will not be large enough to narrow the gap for several years.

Lost Talent

Beyond these temporary conditions, there is another explanation for the failure of the number of scientists and engineers to keep pace with our rising needs. This is the staggering loss between high school and college of young people with the talent to be successful in science and engineering. **Last year between 60,000 and 100,000 high school graduates of college ability failed to enroll in college for financial reasons and perhaps an additional 100,000 did not enter college because of lack of interest.†**

Of the most intelligent 20 percent in the group of college age, fewer than half enter college and only about a third graduate from college. Educational authorities estimate that fewer than 2 percent of those in the college age group who are mentally equipped to obtain Ph. D. degrees will actually obtain such degrees.

Another crucial stage is in the high

*U. S. Bureau of Labor Statistics, *Occupational Outlook Handbook* (Bulletin 940), p. 63.

†Charles C. Cole, Jr. (assistant dean, Columbia College, Columbia University), *Higher Education*, November 1955.

schools, where future scientists and engineers receive their first training in science and mathematics. There are serious weaknesses and signs of deterioration in this vital part of our educational system.

One-quarter of all American high schools offer no chemistry or physics. One-quarter offer no geometry. In many of the schools offering science and mathematics courses, the quality of instruction is low. Last year in the New York City school system alone more than 10,000 students were in science classes taught by teachers who were not trained in science.

This is a situation that threatens to become much worse. Between 1950 and 1955 the number of graduating teachers qualified to teach high school mathematics dropped 53 percent and those qualified to teach science dropped 59 percent. Furthermore, only about 60 percent of the graduates certified to teach mathematics or science in 1955 entered teaching as a career.

On the students' side — partly because of inadequate guidance programs — there has been a drift away from science and mathematics courses. The result of low student interest, and poor high school programs, in science and mathematics is virtually to foreclose careers in science and engineering to many bright young people. They miss the necessary basic training. Many who do attempt to obtain college training in these fields are ill-equipped. Engineering school deans report that fully half of their students enter with deficiencies in mathematics.

Misuse of Trained People

Scientific and engineering careers have long had a reputation for low salaries and limited opportunities for advancement. In recent years starting salaries have sky-rocketed and have been accorded wide publicity. But unfortunately there has been much less improvement in the salaries paid experienced engineers and scientists, especially in government and education. This has lowered the morale of experienced men and provided an incentive to desert engineering and research positions for higher paying jobs in sales or management.

Engineers and research scientists complain also that too much of their time now is spent on tasks that draftsmen and technicians could perform. Unfortunately for easy solution of this problem, however, there is an acute shortage of technicians as well. Worse still, there are indications that some companies in industries using large numbers of engineers have gobbled up technical manpower at a faster rate than they can effectively employ these scarce people.

Another drain on the supply of newly-trained scientists and engineers is military service. About 8,000 of this year's 27,000 engineering graduates were in ROTC programs and committed to active duty after graduation. Dr. A. W. Davison, chairman of the Engineering Manpower Commission of the Engineers Joint Council, says that in most cases no attempt is made by the Armed Services to assign these young officers to duties for which their engineering education specifically prepared them. They are not only withheld from industry and education for two years but also are not utilized in defense programs requiring more engineers and research scientists.

Some of the causes for the present shortage of scientists and engineers — bad advice a few years ago and a college age group held down by depression birthrates in the 1930s — are gradually being overcome. But others, such as the deterioration of science and mathematics training in our public schools and the many instances of ineffective utilization of scarce technical talent, enjoy no such prospect of automatic correction. The final editorial in this series will deal with some practical suggestions for meeting these problems.

This is one of a series of editorials prepared by the McGraw-Hill Department of Economics to help increase public knowledge and understanding of important nationwide developments of particular concern to the business and professional community served by our industrial and technical publications.

Permission is freely extended to newspapers, groups or individuals to quote or reprint all or parts of the text.

Donald C. McGraw

PRESIDENT

McGRAW-HILL PUBLISHING COMPANY, INC.

In World's Largest Power Shovel

USS TRI-TEN "E" Steel in boom and crowd handle ensures continuous operation, in any climate

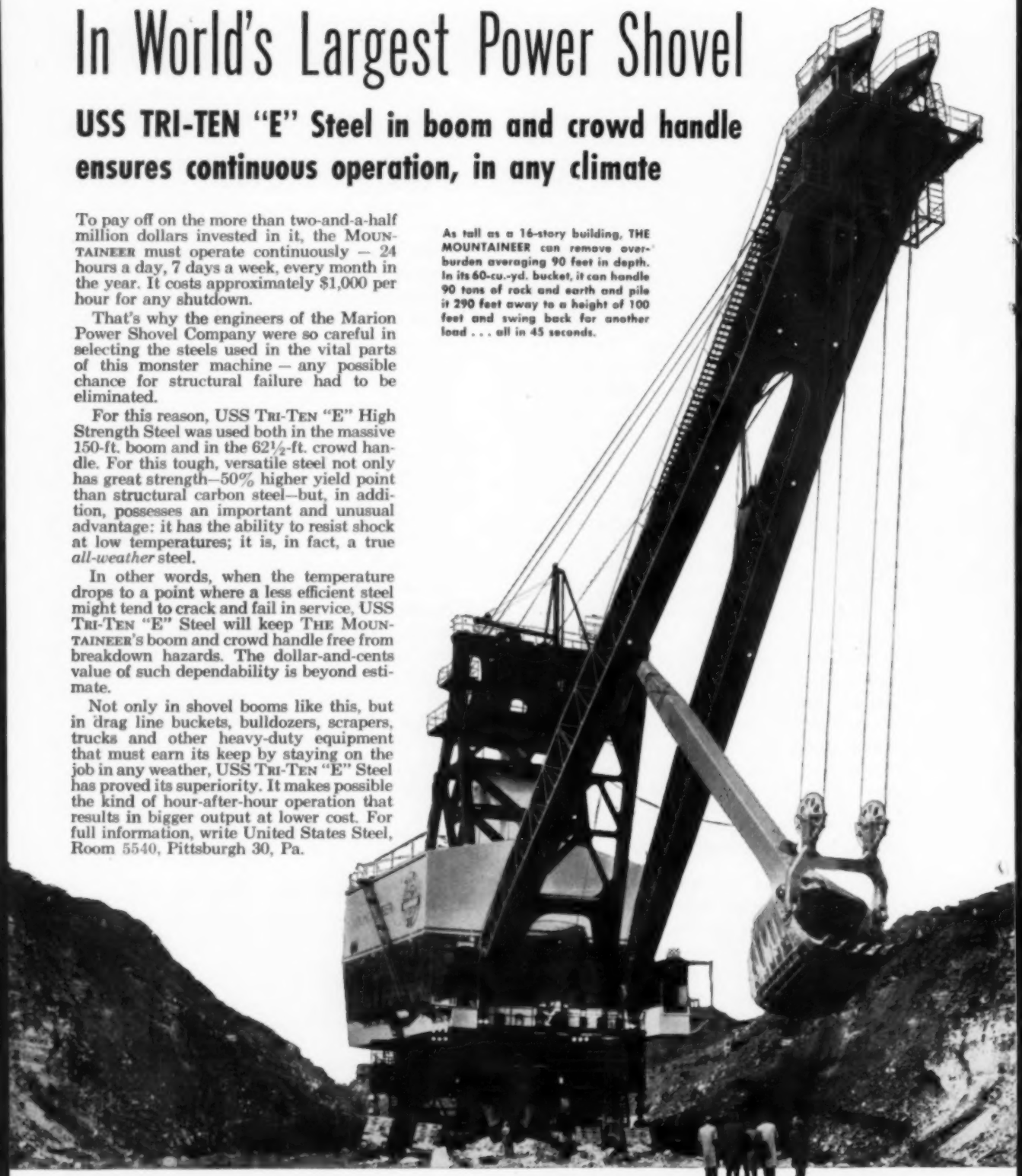
To pay off on the more than two-and-a-half million dollars invested in it, the MOUNTAINEER must operate continuously — 24 hours a day, 7 days a week, every month in the year. It costs approximately $1,000 per hour for any shutdown.

That's why the engineers of the Marion Power Shovel Company were so careful in selecting the steels used in the vital parts of this monster machine — any possible chance for structural failure had to be eliminated.

For this reason, USS TRI-TEN "E" High Strength Steel was used both in the massive 150-ft. boom and in the 62½-ft. crowd handle. For this tough, versatile steel not only has great strength—50% higher yield point than structural carbon steel—but, in addition, possesses an important and unusual advantage: it has the ability to resist shock at low temperatures; it is, in fact, a true *all-weather* steel.

In other words, when the temperature drops to a point where a less efficient steel might tend to crack and fail in service, USS TRI-TEN "E" Steel will keep THE MOUNTAINEER's boom and crowd handle free from breakdown hazards. The dollar-and-cents value of such dependability is beyond estimate.

Not only in shovel booms like this, but in drag line buckets, bulldozers, scrapers, trucks and other heavy-duty equipment that must earn its keep by staying on the job in any weather, USS TRI-TEN "E" Steel has proved its superiority. It makes possible the kind of hour-after-hour operation that results in bigger output at lower cost. For full information, write United States Steel, Room 5540, Pittsburgh 30, Pa.



As tall as a 16-story building, THE MOUNTAINEER can remove overburden averaging 90 feet in depth. In its 60-cu.-yd. bucket, it can handle 90 tons of rock and earth and pile it 290 feet away to a height of 100 feet and swing back for another load . . . all in 45 seconds.

UNITED STATES STEEL CORPORATION, PITTSBURGH • AMERICAN STEEL & WIRE DIVISION, CLEVELAND • COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO
NATIONAL TUBE DIVISION, PITTSBURGH • TENNESSEE COAL & IRON DIVISION, FAIRFIELD, ALA. • UNITED STATES STEEL SUPPLY DIVISION, WAREHOUSE DISTRIBUTORS
UNITED STATES STEEL EXPORT COMPANY, NEW YORK

USS HIGH STRENGTH STEELS

USS MAN-TEN • USS COR-TEN • USS TRI-TEN

USS

UNITED STATES STEEL

Suspended magnet gives you cleaner coal on conveyor belts traveling up to 600 fpm — *and faster*

A Stearns rectangular suspended separation magnet gives you maximum tramp iron removal — even on heavily loaded, unusually fast conveyor lines.

The Stearns rectangular magnet design permits its powerful, deep penetrating magnetic force to effectively remove tramp iron from entire width and depth of material burden — even at belt speeds in excess of 600 fpm. This magnet operates efficiently where other types of equipment can't do the job.

Greater Flexibility

Stearns suspended magnet overcomes space limitations because it can be placed over the head pulley, or anywhere along the belt. Sometimes it's set up to remove tramp iron before coal moves onto the conveyor — thus safeguarding the belt and other processing equipment from damage.

Stearns suspended magnets are economical to install and operate — no need to modify existing conveyor installations.

Custom-Built

Magnetic specialists at Stearns design and build rectangular or circular suspended magnets, electro or permanent magnetic pulleys in standard sizes, or to your individual specifications. Get complete details from your Stearns representative or write for bulletin 25D.

Check these advantages

- *All-welded, moisture-proof construction*
- *No moving parts that require replacement*
- *Single-coil construction for magnetic field stability*
- *Suspension cables, where required, let you change magnet's angle of inclination quickly*
- *Vacuum-impregnated windings for long life, dependable operation*

1153

STEARNS MAGNETIC PRODUCTS

A DIVISION OF THE INDIANA STEEL PRODUCTS COMPANY • VALPARAISO, INDIANA

South 28th Street • Milwaukee 46, Wisconsin

When all the shouting is over and the last campaign speech has been made, isn't this what all the struggle is really about?

You and your neighbors are going to march to the polls November 6 and settle things the American way.

Not by fists or by force, not with a penalty if you don't vote, or the secret police checking up to see if you did.

You'll vote because it's the thing to do.

Vote as you please, of course—but vote.

Vote for the party and the candidates you honestly believe will represent you best.

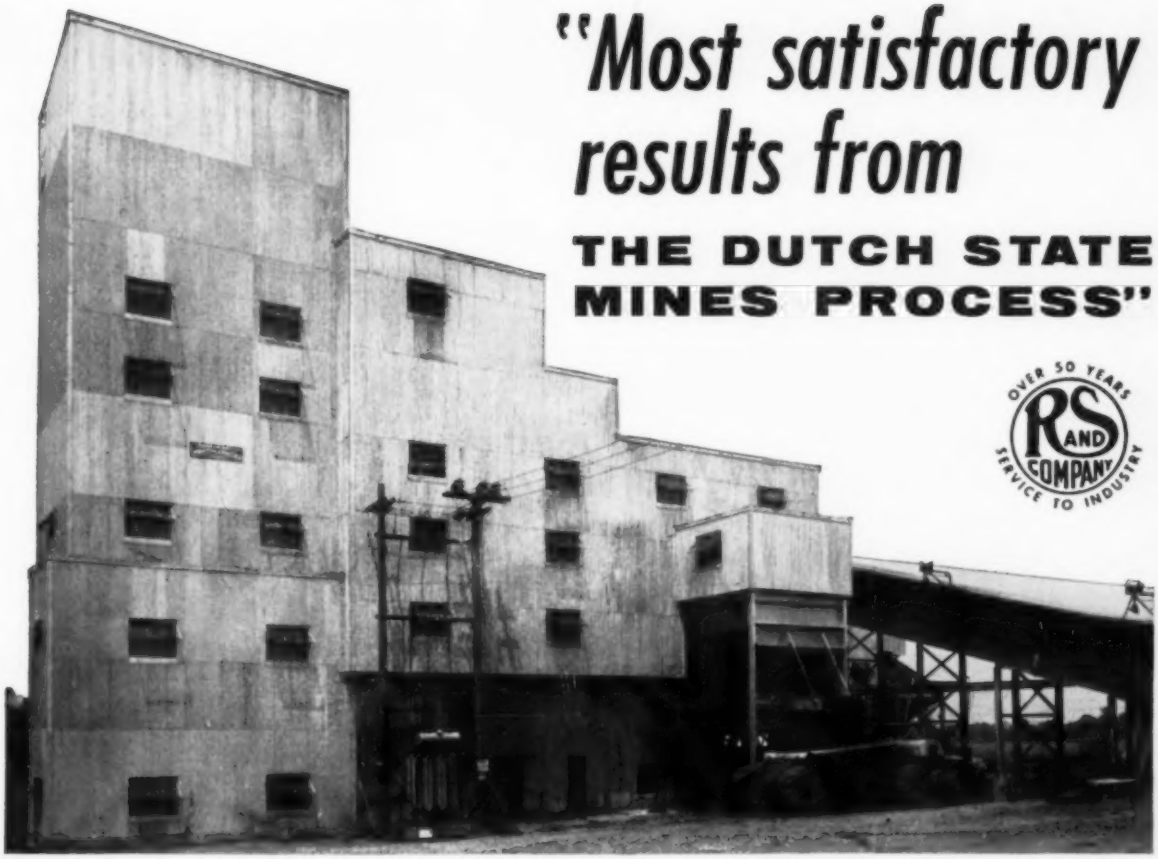
But also vote because you believe in this democracy of ours and you want to keep it the way it is—a country where you can have your say and nobody else can say it for you.

Everybody you know will be there.

We'll see you at the polls.

VOTE NOVEMBER 6th!

"Most satisfactory results from THE DUTCH STATE MINES PROCESS"



OVER 50 YEARS R AND S COMPANY SERVICE TO INDUSTRY

Dutch State Mines heavy medium process showing the static pool vessel and flights removing pure coal.

Pure coal after the final rinse.

says Frank Nugent, Executive Vice President, Freeman Coal Mining Corporation, speaking of his experience with the Dutch State Mines heavy medium separation process installed by Roberts & Schaefer in Freeman Mine No. 4 Williamson County, Illinois.

Freeman had approached R & S engineers with the problem of obtaining high quality coal from their new mine operating in the quality circle in Southern Illinois. This was the perfect application for the recently acquired Dutch State Mines process. With more than 50 years of coal preparation plant experience, including the designing and building of the most modern washing equipment for normal coal preparation, Roberts & Schaefer had realized that the trends required more precise cleaning. They had, therefore, secured the franchise to market the Dutch State Mines process in the United States. R & S were ready. Freeman needed the best coal washing equipment in the world—and they got it!

The plant has now been in operation for over six months and has thoroughly proved its efficiency; in fact, results are far better than were originally thought possible. As a result, Freeman is producing quality coal for quality customers.

Do you have a washing problem that is unusually severe? Possibly the Dutch State Mines process is what you need to solve it. Phone, wire or write for consultation.

ROBERTS and SCHAEFER COMPANY

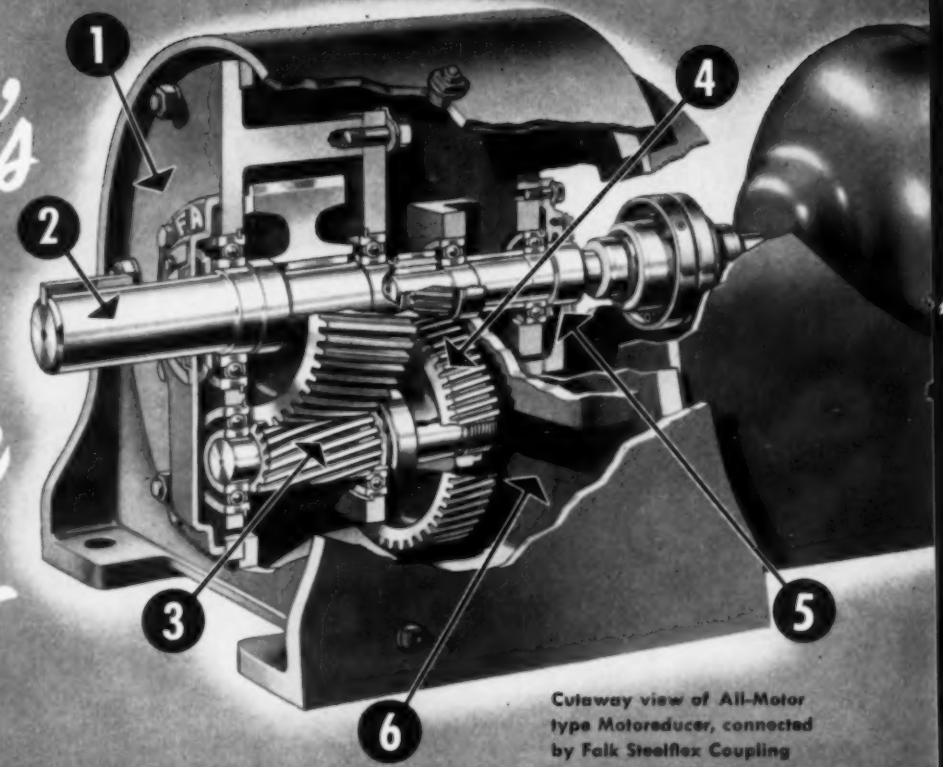
SUBSIDIARY OF THOMPSON-STARRETT COMPANY, INC.

ENGINEERS AND CONTRACTORS

130 North Wells Street, Chicago 6, Illinois

New York 19, N. Y.—254 West 54th Street
Pittsburgh 22, Pa.—1315 Oliver Building
Huntington 9, W. Va.—P. O. Box 570
Hibbing, Minnesota—P. O. Box 675

Here's the inside story—



Cutaway view of All-Motor type Motoreducer, connected by Falk Steelflex Coupling to standard NEMA frame motor

WHY Falk Motoreducers give better service—have longer life

Here is the "inside story" behind the all-steel All-Motor type FALK Motoreducer's universal reputation as a gear drive unmatched in quality, efficiency, dependability, ease of maintenance and long life. These "In-built" factors are—

1 **ALL-STEEL HOUSINGS.** Rugged, strong, rigid...all parts are manufactured from heavy steel plate, formed and welded in the Falk Weld Shop.

2 **LARGE OVERHUNG LOAD CAPACITY.** Large shafts, oversize bearings...rigid mountings with wide bearing spans to handle maximum applied loads.

3 **PRECISION GEARING.** Heat-treated alloy steel gearing, precision cut and shaved after heat treatment to eliminate distortion. Quiet, crown-shaved pinions.

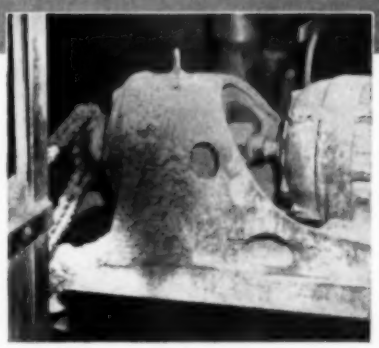
4 **EXTRA-CAPACITY GEARING.** Special extra-capacity gear-tooth form with larger contact area gives greater strength, higher load-carrying capacity.

5 **SEALED HOUSINGS.** Splashproof, dustproof, oil-tight construction. Dual closures and one-way vents keep oil in, dust and moisture out.

6 **POSITIVE LUBRICATION.** Large sump capacity...oiltight construction assures clean lubricant...revolving elements lubricated by direct dip.

When you buy or specify the All-Motor type FALK Motoreducer, you get all these—plus the tremendous advantage of full interchangeability of motors. Switch motors as desired—use any make, style or type of standard foot-mounted motor within the unit's AGMA rating—with a minimum of difficulty or "down time."

Available in sizes up to 75 hp—*with or without motor*—from convenient factory, field or distributor stocks, from coast to coast. **Write for Bulletin 3100.**



60,000 HOURS WITHOUT A FAILURE!

Sixty thousand hours is a lot of hours—but the FALK Motoreducer in the unretouched photo above has served that long without failure or need of repair.

This 3 hp unit is one of over 60 FALK Motoreducers in daily service in an Eastern plant of a large milling company, whose president says, in part:

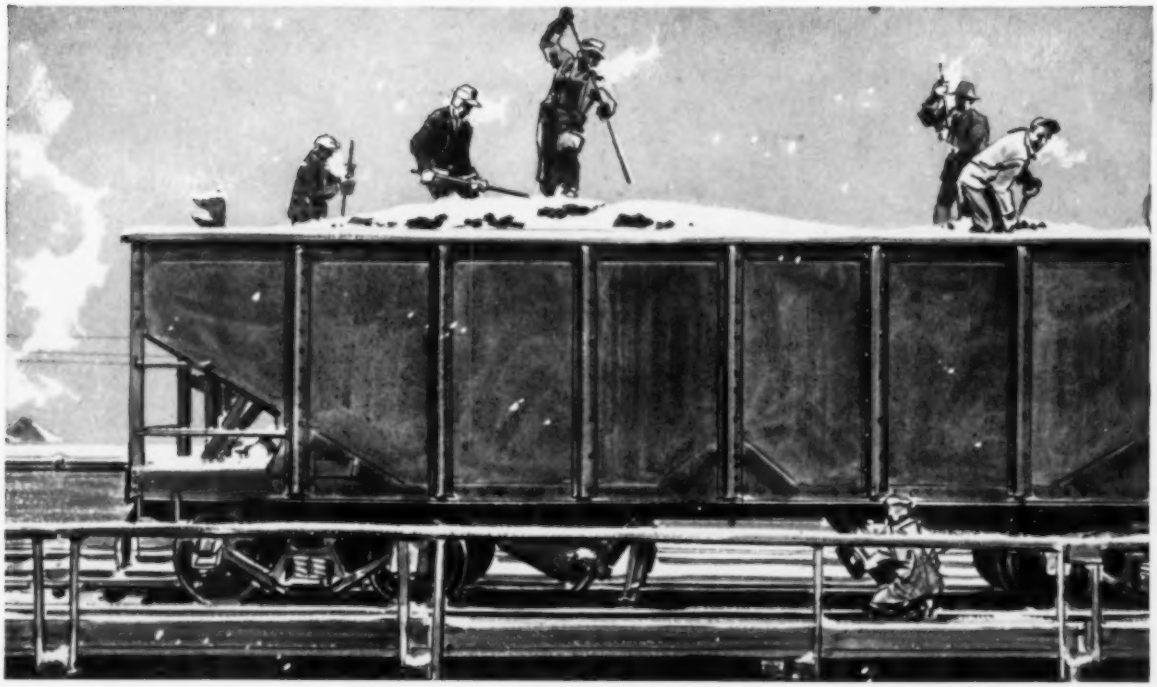
"One of the main advantages of FALK Motoreducers is their adaptability to any motor. Reducers and motors can be easily interchanged....Our service records confirm the wisdom of our choice of FALK equipment as our standard."

FALK ...a good name in industry

THE FALK CORPORATION, MILWAUKEE, WISCONSIN

MANUFACTURERS OF

- Motoreducers
- Speed Reducers
- Flexible Couplings
- Shaft Mounted Drives
- High Speed Drives
- Special Gear Drives
- Single Helical Gears
- Herringbone Gears
- Marine Drives
- Steel Castings
- Weldments
- Contract Machining



Frozen coal won't build repeat business for you

Freezeproof your coal with Morton "Formula 5"

It's foolish to run the risk of antagonizing your customers by shipping them frozen coal when it's so easy and economical to freezeproof your coal with Morton "Formula 5."

Morton "Formula 5" is the inexpensive freezeproofing compound made exclusively for the coal industry. Effective even at sub-zero temperatures, "Formula 5" ends costly unloading delays. It keeps coal free-running . . . keeps your customers happy by saving them time, labor and money.

Morton "Formula 5" is economical to apply. It needs no mixing, no extra handling. It's a free-pouring, dry product composed of chemically treated sodium chloride (30-70 mesh) and a special anti-corrosive compound. Just apply dry, direct to the coal.

Look at the advantages of using "Formula 5"

• *Low cost of application* • *Scientifically treated to produce an ideal dissolving rate and minimize loss during initial draining* • *Will not lump in feeder* • *Contains a rust inhibitor to protect your equipment* • *Harmless to coal, harmless to hands and clothing* • *Can be used for conveyor equipment, switches, tracks, etc.* • *Readily available—comes in tough, 100-lb. bags.*

Send for more information today!

Please send me your free booklet, "The Key to Low Cost Freezeproofing Application."

Name .....

Company .....

Street .....

City ..... *Zone* .... *State* .....

MORTON SALT COMPANY
INDUSTRIAL DIVISION
Dept. CA-11, 120 So. La Salle Street, Chicago 3, Illinois

Quality-built for dependable, high-output stripping and loading...

the big, rugged LIMA Type 2400

It takes a big, rugged machine like the Type 2400 to give you fast, dependable, high-output stripping and loading service. This heavy-duty 6 yd. shovel is quality-built by Lima to stay on the job, deliver peak operating performance on the tough assignments. It's easily convertible for dragline operation, too.

Air operated clutches make the Type 2400 easy to handle. Wide, long crawlers give it plenty of bearing area for stability and maneuverability on soft footing. Tandem mounted drums give maximum cable capacity. These plus Lima's quality "extras" (see right) have made the Type 2400 a hands-down favorite with users around the world.

Get the full story on the quality-built Type 2400 today. See your nearby Lima distributor, or write Construction Equipment Division, Baldwin-Lima-Hamilton Corporation, Lima, Ohio.

COMPARE QUALITY! No other machine gives you as much as LIMA!

1. Piston-type dirt seal rings and retainers in crawler rollers.
2. Moving parts are flame or induction hardened for longer life.
3. Two-shoe swing and propel clutches; air control.
4. Anti-friction bearings at all important bearing points.
5. Big capacity drums and sheaves are easy on cables.
6. Propel and swing gears and power take-off are enclosed in a sealed oil bath.
7. Torque converter (standard equipment).
8. Wherever you are, you can depend on skilled service and nearby warehouse stocks of parts to keep your LIMA on the job continuously.

COMPARE and you'll specify LIMA for shovels (½ yd. to 6 yds.), cranes (to 110 tons) and draglines (variable). Smaller capacities available on rubber.

DISTRIBUTORS IN PRINCIPAL CITIES OF THE WORLD

BALDWIN BLH LIMA-HAMILTON

LIMA SHOVELS • CRANES • DRAGLINES • PULLSHOVELS

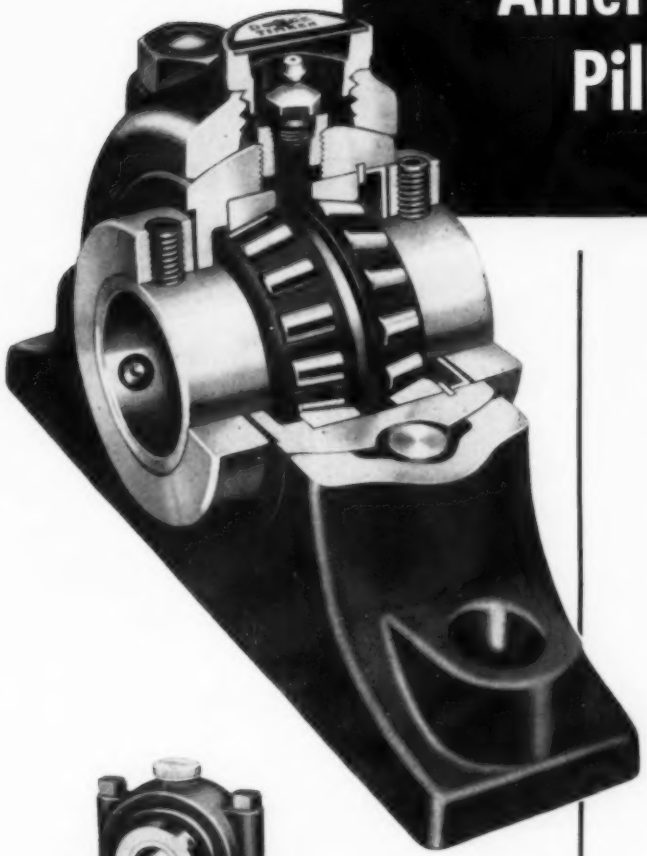
BALDWIN-LIMA-HAMILTON

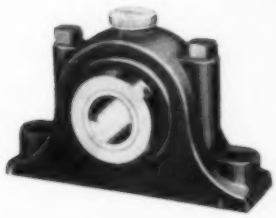
Construction Equipment Division — LIMA WORKS

OTHER DIVISIONS: Austin-Western • Eddystone • Electronics & Instrumentation • Hamilton • Loewy-Hydropress • Madsen • Pelton • Standard Steel Works

AVAILABLE IN FIVE TYPES
FOR ALL KINDS OF SERVICE

DODGE-TIMKEN
America's Quality Pillow Block





- COMPLETELY ASSEMBLED
- FACTORY ADJUSTED
- PRE-LUBRICATED

Call the Transmissioneer, your local Dodge Distributor. Factory-trained by Dodge, he can give you valuable assistance on new, cost-saving methods. Look for his name under "Power Transmission Machinery" in your classified telephone directory, or write us.

DODGE-TIMKEN Bearings are adjusted, lubricated and sealed at the factory. Labrynth seals effectively retain the lubricant and prevent the entrance of dust and dirt. The inbuilt precision of Dodge-Timken Bearings is protected both on and off the shaft. They are delivered fully assembled, ready to mount.

Where service conditions are toughest Dodge-Timken Bearings prove their quality decisively. For superior performance, dependability and long life they have won their reputation throughout industry as America's quality pillow blocks.

To meet varying service requirements Dodge-Timken Pillow Blocks are available in five types—the type E . . Double Interlock (illustrated) . . Type C . . Special Duty . . . and All-Steel. Available in a range of shaft sizes from 1-3/16" to 10".

Call your Transmissioneer; or write for Bulletin A638 giving load ratings, dimensions and other data on Dodge-Timken Roller Bearings.

DODGE MANUFACTURING CORPORATION
3000 Union Street, Mishawaka, Indiana

DODGE
of Mishawaka, Ind.

3 ways to cut mining cable costs...

1. USE OKOCORD STANDARD CONSTRUCTIONS

Each Okocord construction has been designed to cut cable replacements on specific mining machines. Standard constructions for most of the important services are built from the conductor out to insure long life in the face of continual high speed reeling, rock-falls, frequent run-overs and constant dragging over mine floors and around corners. Here are four Okocord standard constructions.

Single Conductor—Reel cable made extra flexible and tough, Hex-Tite assembly to withstand re-reeling, rubbing and scraping.

Two-Conductor Round, Type G—Cable with two ground wires and two insulated conductors possesses maximum flexibility.

Three-Conductor Type W—Cable with three insulated conductors is available with heat-resistant insulations for either low or high voltages.

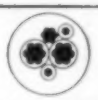
Twin Type G—Cable designed for maximum safety and reel capacity has center grounding wire and two insulated conductors.

2. USE OKONITE SPECIAL CONSTRUCTIONS

When you need a cable with unique specifications, consult with Okonite and avoid the costly troubles that often result from makeshift solutions. Special constructions are available for the newest mining equipment, including all types of continuous miners. Here are examples of the many Okocord special constructions that are manufactured to the same rigid specifications as standard constructions.

Three Conductor-Type PG—Special cable for d-c systems has uninsulated grounding wire which is approximately half the size of the two insulated conductors.

Four-Conductor Type PG—Special cable for d-c systems is similar to three-conductor type except with 3 insulated conductors.

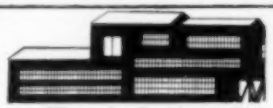


Five-Conductor Type PCG—Special cable for "permissible" equipment features 1 uninsulated grounding, 2 insulated control and 2 insulated power conductors.

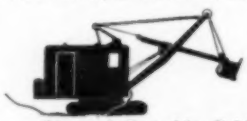
Six-Conductor Type PCG—Special cable for a-c systems is similar to five-conductor type except with 3 insulated conductors.

3. CONSULT WITH OKONITE ENGINEERS

The Okonite engineering staff is always ready to help you in the planning stage. Plant or mine power distribution, borehole or shaft cables, control systems, telephone circuits, conveyor controls . . . whatever your needs, Okonite will gladly help you select the safest and most economical cable for the job. Write or phone either our nearest district office or The Okonite Company, Dept. CA, Passaic, N. J.



. . . Watertite-Insulated Wire, Keystone-Insulated Wire, Okocord Flexible Cords, Watertite-Insulated Control Cable, Aerial Cable, Line Wire . . .



. . . Okocord Portable Cables Types W, G, SH-A, SH-B, SH-C, SH-D . . . Blasting Wire, Redshot Type RG, Type D Braided . . .

. . . Okocord Mine Drill and Control Cord, Okocord Type SO, Parkway, Okonite Mine Power Cable, Okocord Twin Type W . . .

. . . Continuous Mining Cable, Okocord Two-, Three-, Four-, Five-, and Six-Conductor Types G, W, PG, and PCG . . . Steel Armored, Self-Supporting . . .

where there's electrical power . . . there's **OKONITE CABLE**

4184-A

Here Now! NEW CHEVROLET TASK·FORCE 57 TRUCKS!

FIRST with the MOST modern features

They're out to save you hours and dollars on any hauling job . . . and they've got big new power plus the modern features that make it a sure thing! They put you way ahead with time- and work-saving advantages you won't find in any other truck!

Again, for 1957, Chevrolet medium- and heavy-duty trucks bring you the industry's most advanced features—new developments that have already been proved in a history-making pre-announcement test run! (See below.)

For '57 there's bold new styling to match Chevy's remarkable stamina and dependability. There's fleet-action power in Chevy's outstanding engine line-up for '57—with the 195-h.p. Loadmaster V8 standard in all 9000 and 10000 Series trucks, and the sensational new 283-cu.-in. Taskmaster V8 (160 h.p.) standard in 5000, 7000 and 8000 series models.

Many models are equipped with bigger, brawnier rear axles. And there's a load of heavy-duty options for '57—including Chevy's revolutionary 6-speed Powermatic transmission, designed especially for heavy-load high-mileage hauling.

Be sure to check the new cab features, too . . . the handsome new upholstery, the new steering wheel, the new exterior colors. Your Chevy dealer has all the details, so see him soon! . . . Chevrolet Division of General Motors, Detroit 2, Michigan.

Alcan Highway Test Run Proves Chevrolet Ruggedness!

In an AAA-certified endurance run, 6 light-, medium- and heavy-duty trucks carrying typical cargoes roared up the 1,520-mile Alcan Highway (normally a 72-hour run) in less than 45 hours! In dramatic fashion, new Chevy trucks conquered one of the world's most challenging roads to display the great performance qualities they'll bring to *your* roads!

NEW SPEED AND DRILLING ECONOMY

Parmanco

Model 51-55 Dual
COAL DRILL

TWO DRILLS IN ONE

"It's a life saver to us"
says W. V. Hartman, Supt. Victoria Coal Corp.

Working ahead of an 8-yard loading shovel in 4-ft. coal, speed is essential.

Traction, hydraulic and electrical system operated by 109 hp engine. Push button controls. Drills can be operated singly or in tandem.

CUTTINGS SHIELD and GUIDE
—completely automatic

Blast holes, as seen in the picture, are kept clean from cuttings dropping back down the hole. A dam is formed about each blast hole excluding casual surface water.

•

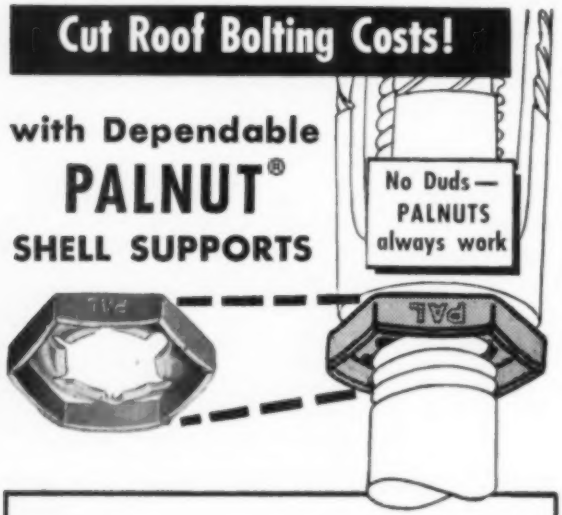
SEND FOR COMPLETE DETAILS

•

PARIS MANUFACTURING CO.
PARIS, ILLINOIS

Cut Roof Bolting Costs!

with Dependable
PALNUT®
SHELL SUPPORTS



PALNUTS hold in softer types of strata where other shell supporting methods are often inadequate. Cuts costs by eliminating re-installation of bolts caused by shell support failure.

PALNUTS cost less than ½ as much as forged ears. Are easy and fast to assemble—offer worthwhile savings over other shell supports when plain bolt, PALNUT and standard type shell are assembled underground.

PALNUTS are also widely used on reclaimed bolts.

You can buy roof bolts with PALNUTS pre-assembled or buy PALNUTS separately from your jobber.

THE PALNUT CO. 31 Glen Road, Mountainside, N. J.
Subsidiary of United-Carr Fastener Corporation

CORE DRILLING
—anywhere

"We look into the Earth"

PENNSYLVANIA Drilling CO.

DRILLING CONTRACTORS AND MFRS.
1205 Chartiers Ave. **Pittsburgh, Pa.** WAlnut 1-5816

Listen!
Look!
Talk!
Argue!
Think!
then **VOTE**

SIMPLEX MINE JACKS

3 HUSKY MINERS

★ Ratchet lowering type for extra safety
★ 5-tons capacity
★ Double-lever sockets permit lifting in close quarters
★ Full capacity on cap OR toe
★ Safety Speed Trigger
★ Ideal for re-railing, repairs, skidding

No. 84A for Thin Seams 14" high, 7" lift

No. 85A for Medium Seams 17" high, 10" lift

No. 86A for Thick Seams 20" high, 13" lift

Hi-Speed TIMBER JACK

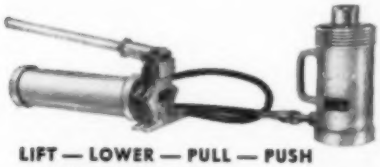
Gear Cover Not Shown

Screw Insures Safety

Bevel Gears and Crank Twice as Fast as Lever Nut Type

MODEL No. 642 LIFTS 6 TONS

Combines safety of screw jack with fast action of crank. Head swivels. Five models with min. ht. from 3'6", max. ht. to 9'6".



LIFT — LOWER — PULL — PUSH — Safely from a Distance

Re-Mo-Trol hydraulic pump and remote controlled ram and puller works in tight spots—in any position. Ram or puller can be operated from 6' or more away. Models from 10 to 100-tons, from 30-tons with famous Simplex "Center-Hole" for easier, safer pulling.

Write for Bulletin Mines 55 for data on the most complete line of Mine Jacks

WORLD'S LARGEST MFGRS. OF INDUSTRIAL MECHANICAL AND HYDRAULIC JACKS

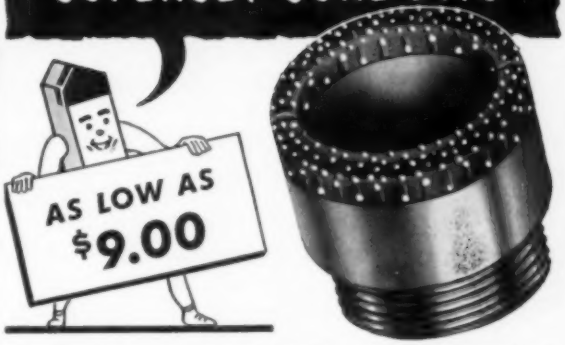
SIMPLEX JACKS

RE-MO-TROL · UTIL-A-TROL · JENNY · ROL-TOE

TEMPLETON, KENLY & CO.

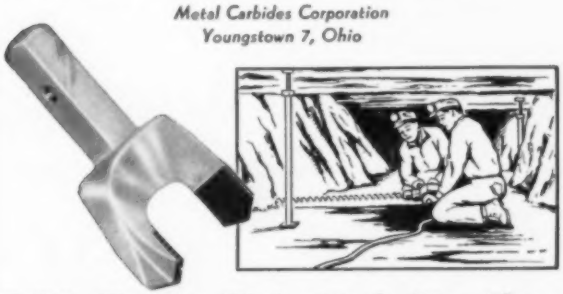
2501 Gardner Road
Broadview, Illinois

SUPERSET CORE BITS



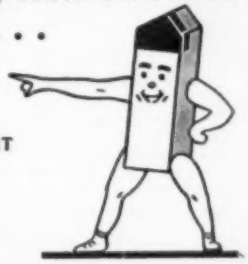
● Mining contractors, ore prospectors, coal operators and construction firms are realizing tremendous savings by taking advantage of our **exclusive fabrication service!** Contractors send us the necessary diamond stones from their own stocks—we hand set them in a super-hard tungsten carbide crown and braze to the threaded steel blank. Hand-set bits assure the proper positioning of each diamond stone to achieve maximum cutting efficiency. The carbide matrix holds the diamond stones until entirely used up. These advantages mean lower drilling costs to you. We can also supply complete core bits or salvage the stones from used bits at nominal cost. Supplied in standard sizes EX, EXE, AX, BX, NX, etc.

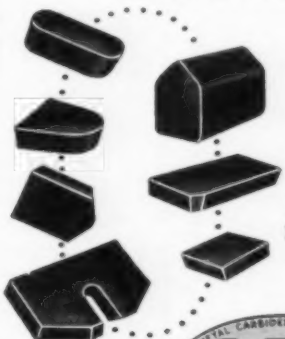
Metal Carbides Corporation
Youngstown 7, Ohio



Talide Tips for Mining Tools Give These 3 BIG ADVANTAGES . . .

1. EXTRA STRONG
2. SUPER HARD
3. SHOCK RESISTANT





● A complete line of low-cost, high-quality Talide Tips is offered fabricators and users for tipping machine bits, rock bits, drill bits, roof bits and open-pit bits. All Talide Tips have a special surface finish that facilitates brazing. Non-standard shapes and sizes quoted on request.

METAL CARBIDES CORPORATION
MC TALIDE
YOUNGSTOWN 7, OHIO
SINTERED CARBIDES · HOT PRESSED CARBIDES
HEAVY METAL · CERMETS · HIGH TEMPERATURE ALLOYS
OVER 25 YEARS' EXPERIENCE IN TUNGSTEN CARBIDE METALLURGY

Thousands of Coal Mine Officials Helped Prepare Your 1956 Coal Age Mining Guidebook

Why Not Profit From Others' Experience?

When you're looking for new ideas, need a fresh slant on your operating problems or just want to check the latest in mining methods or equipment, the Mid-July 1956 COAL AGE Mining Guidebook and Buying Directory Issue is a good place to start. You'll find the Guidebook a practical on-the-job reference manual for every-day use—simply because it reports, analyzes and briefs the current operating practice and results at hundreds of the most efficient mines. Here in one volume are the ideas and experience of thousands of successful operating men.

No matter what your job—in deep mining or stripping, maintenance, preparation, supply handling or safety—you'll find the COAL AGE Guidebook a worthwhile working tool. Remember too, the 62-page Buying Directory Section lists all the known manufacturers of over 1,000 products used in coal mining, completely revised and up-dated for the 1956 issue. This directory, along with the manufacturers' advertising and the Index to Advertisers, Sales Offices and Distributors, will help you quickly locate the supply source nearest you.

KEEP YOUR 1956 GUIDEBOOK HANDY . . . USE IT REGULARLY

PROFESSIONAL SERVICES

NEWELL G. ALFORD
Consulting Mining Engineer
Coal Property Prospecting
Development, Operation and
Valuation
Oliver Building — Pittsburgh 22, Pa.

YOUR card here builds prestige for you and helps to make your name familiar in the field. The cost is extremely small in proportion to its value as a business aid.

DAVIS READ
Consulting Engineer
Layout — Operation
Modern Production Methods
Plant Design — Preparation
120 S. La Salle St. — Chicago 3, Ill.

ALLEN & GARCIA COMPANY
42 Years' Service to the
Coal and Salt Industries and Consultants
Construction Engineers and Managers
Authoritative Reports and Appraisals
332 S. Michigan Ave., Chicago
120 Wall Street, New York City

KIRK & COWIN
Ralph E. Kirk — Percy G. Cowin
Registered Professional Engineers
Consulting—Reports—Appraisals
Mechanical Mining of Ore & Coal
Management and Construction of Mines
1—18th St., SW — Birmingham, Ala.
Phone 34-2366

ROBINSON & ROBINSON
Consulting Engineers
Mine Operation — Preparation
Coal Property Valuation
Industrial Engineering
Union Bldg. — Charleston, W. Va.

GEO. S. BATON & COMPANY
"Founded 1896"
Consulting Engineers
Coal Analysis — Valuations
Mine and Preparation Plant Designs
1100 Union Trust Building — Pittsburgh 19, Pa.

HERBERT S. LITTLEWOOD
Consulting Engineer
Application—Supervision of Installation
Maintenance—Inspection—Testing
POWER-HAULING HOISTING
VENTILATION
R. D. #3, Irwin, Pa.

J. W. WOOMER & ASSOCIATES
Consulting Mining Engineers
Modern Mines Systems and Designs
Foreign and Domestic Mining Reports
Henry W. Oliver Bldg. — Pittsburgh, Penna.

EAVENSON, AUCHMUTY & SUMMERS
Mining Engineers
COAL OPERATION CONSULTANTS
VALUATION
2720 Koppers Bldg. — Pittsburgh 19, Pa.

J. B. MORROW
Coal Consultant
Oliver Building — Pittsburgh, Pa.

PAUL WEIR COMPANY
Mining Engineers and Geologists
Consultants and Managers
DESIGN and CONSTRUCTION
20 North Wacker Drive — Chicago 6, Illinois

CLASSIFIED SEARCHLIGHT SECTION ADVERTISING

EMPLOYMENT • BUSINESS • OPPORTUNITIES • EQUIPMENT—USED or RESALE

UNDISPLAYED RATE:
$1.20 a line, minimum 3 lines. To figure advance payment count 5 average words as a line.
POSITION WANTED undisplayed advertising rate is one-half of the above rate, payable in advance.
BOX NUMBERS count as 1 line additional.

INFORMATION:
DISCOUNT OF 10% if full payment is made in advance of four consecutive insertions of undisplayed ads (not including proposals).
EQUIPMENT WANTED OR FOR SALE Advertisements acceptable only in Displayed Style.
AN ADVERTISING INCH is measured ⅞ inch vertically on one column, 3 columns—30 inches to a page.

DISPLAYED RATE:
The advertising rate is $12.50 per inch for Equipment and Business Opportunity advertising appearing on other than a contract basis. Contract rates quoted on request.

EMPLOYMENT OPPORTUNITIES—$21.00 per inch, subject to agency commission.

Send New Advertisements or Inquiries to Classified Advertising Div. of Coal Age, P. O. Box 12, New York 36, for December issue closing Nov. 16th

---

WANTED
PREPARATION PLANT FOREMAN OR ENGINEER.
Long established coal mining company in Utah has an opening for an experienced preparation plant foreman or engineer. Technical training is desirable but not necessarily a prerequisite. Salary open. Send references, photo, outline of experience and salary expected to P-3096, Coal Age, 68 Post St., San Francisco 4, Calif.

SURPLUS EQUIPMENT FOR SALE
2 G.E. 10 ton locomotive, 42" gauge
1 2300 volt, 200 h.p. mine hoist
THE OHIO MINING COMPANY
NELSONVILLE, OHIO
Phone 230

BUSINESS OPPORTUNITY

STRIP COAL WANTED
Lease or purchase—large or small tracts. Morgan Coal Company, 2850 North Meridian Street, Indianapolis 8, Indiana.

WANTED

Anything within reason that is wanted in the field served by Coal Age can be quickly located through bringing it to the attention of thousands of men whose interest is assured because this is the business paper they read.

LEGAL NOTICE

STATEMENT REQUIRED BY THE ACT OF AUGUST 24, 1912, AS AMENDED BY THE ACTS OF MARCH 3, 1933, AND JULY 2, 1946 (Title 39, United States Code Section 233) SHOWING THE OWNERSHIP, MANAGEMENT, AND CIRCULATION OF

COAL AGE published monthly with add'l issue Mid-July at Philadelphia, Pa. for October 1, 1956.

1. The name and address of the publisher, editor, managing editor and business manager is: Publisher, McGraw-Hill Publishing Company, Inc., 330 West 42nd Street, New York 36, N.Y.; Editor Ivan A. Given, 330 West 42nd Street, New York 36, N.Y.; Managing editor, Harold Danis, 330 West 42nd Street, New York 36, N.Y.; Business manager, Raymond H. Smalley, 330 West 42nd Street, New York 36, N.Y.

2. The owner is McGraw-Hill Publishing Company, Inc., 330 West 42nd St., New York 36, N.Y. Stockholders holding 1% or more of stock are: Donald C. McGraw and Willard T. Chevalier, Trustees under Deed of Trust dtd. 1/14/21, as amended, m/b James H. McGraw, deceased; Donald C. McGraw and Harold W. McGraw as Trustees under Indenture m/b James H. McGraw dated 7/1/37, as amended; Donald C. McGraw, individually; Harold W. McGraw, individually; Elizabeth M. Webster, c/o Donald C. McGraw (all of 330 West 42nd St., New York 36, N.Y.); Mildred W. McGraw, Madison, New Jersey; Grace W. Mehren, 536 Arenas St., La Jolla, Calif.; Genoy & Co., P.O. Box 491, Church St. Station, New York, N.Y.; Merrill, Lynch, Pierce, Fenner & Beane, 70 Pine St., New York, N.Y.; Touchstone & Co., c/o Wellington Fund, Inc., Claymont, Delaware.

3. The known bondholders, mortagees, and other security holders owning 1 percent or more of total amount of bonds, mortgages, or other securities are: None.

4. Paragraphs 2 and 3 include, in cases where the stockholders or security holder appears upon the books of the company as trustees or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting; also the statements in the two paragraphs show the affiants full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner.

McGRAW-HILL PUBLISHING COMPANY, INC.
By John J. Cooke, Secretary

Sworn to and subscribed before me this 14th day of September, 1956.
[SEAL] JANET A. HARTWICK.

(My commission expires March 30, 1957)

FOR SALE OR LEASE

Modern deep mine and contiguous low volatile acreage located in Central Pa.—"C" Seam. Mine equipped and in condition for immediate operation. Loading on NYC—Shipments also via PRR.

BO-2964 Coal Age
Class. Adv. Div., P. O. Box 12, N. Y. 36, N. Y.

FOR SALE: STRIP MINE

Going operation. Equipment, acreage and tipple. Government contract. Located Southern Tennessee. Reason for selling, other interests. Includes 6 yard Page dragline, 2 yard Lorain deisel loading shovel, 2 D8 Dozer, Cat 12 Grader, D4 Dozer, complete tipple, bins and ramp, crusher, car puller, 40 car railway siding, 100 KW deisel electric power plant. Large coal acreage, trucks, pumps, tools, shops, tipple office, misc. parts, etc. One (1) year coal contract.

Also have real estate for administrative personnel, a modern house and two (2) guest houses on main highway located on 8 acres of land. Principals only. For further details reply

FS-3202, COAL AGE
520 N. Michigan Ave., Chicago 11, Ill.

FOR SALE
100 ALL STEEL MINE CARS
42" GA. PICTURE ON REQUEST.
HARRY ELLANOVITZ
DILLONVALE, OHIO

---

2 TELEPHONES $22.75

Inter-communication handsets, two wire system. Included Two 3 volt batteries, 50 ft. of wire and simple wiring instructions. Additional wire 1 cent per ft. or $25.00 per mile. Complete list of telephone parts, handsets, magneto—common battery — and dial telephones, switchboards, etc. All shipments FOB Simpson, Penna.

Telephone Engineering Co., Dept. 5CA6, Simpson, Pa.

WANT TO TRADE

We have Fletcher Roof Bolter DAF-7, C-2, S-2 to trade for Jeffrey Roof Bolter 56-RDR.

T-3097 Coal Age
520 N. Michigan Ave., Chicago 11, Ill.

WANTED TO TRADE

2 Sullivan 7-AU Cutting Machines
(1 truck mounted, 1 caterpillar mtd)
for 1 JOY 11-RU CUTTER or any universal cutter, rubber tire mounted, 31" high.
Write
W-3304—Coal Age
Class. Adv. Div., P.O. Box 12, New York 36, N.Y.

SHOVELS — DRAGLINES DRILLS CRANES — EUCLIDS

9W Bucyrus Erie Drag, 165', 10 yd.
625 Page Diesel Drag, 150', 10 yd.
625 Page Diesel Drag, 160', 9 yd.
6160 Bucyrus Monighan Elec. Drag, 160' 8 yd.
621 Page Diesel Drag, 135', 5 yd.
621 Page Diesel Drag, 125', 7 yd.
7200 Marion Drag, 120', 7 yd.
200-W Bucyrus Monighan Drag, 140', 6 yd.
2400 Lima Drag, 120', 6 yd.
4500 Manitowoc Drag, 120', 5 yd.
620 Page Diesel Drag, 115', 6 yd.
120-B Bucyrus Erie Elec. Drag, 115', 5 yd.
111-M Marion Drag, 80', 5 yd.
1055 P&H Drag, 110', 4 yd.
1201 Lima Drag, 85', 3 yd.
3500 Manitowoc Drag, 80', 2½ yd.
1001 Lima Drag, 80', 2½ yd.
955 P&H Drag, 100', 2½ yd.
54-B Bucyrus Erie Drag, 85', 2½ yd.
80-D Northwest Drag, 65', 2½ yd.
170-B Bucyrus Erie Elec. 6½' yd. Shovel
1660 P&H Elec. 6 yd. Shovel
1500 P&H Elec. 5 yd. Shovel
120-B Bucyrus Erie Elec. 4½ yd. Shovel
111-M Marion 4 yd. Elec. Shovel
111-M Marion 4 yd. Diesel Shovel
1055 P&H 3½ yd. Shovel
1201 Lima 3½ yd. Standard Shovel
111-M Marion 3 yd. High Lift Shovel
1201 Lima 2½ yd. High Lift Shovel
3500 Manitowoc 3 yd. High Lift Shovel
80-D Northwest 2½ yd. Shovel
54-B Bucyrus Erie 2½ yd. Shovel
38-B Bucyrus Erie 1½ yd. Shovel
25 Northwest ¾ yd. Shovel
22-B Bucyrus Erie ¾ yd. Shovel
Unit 1020 ¾ yd. Shovel
802 Lima Cranes
600 Reich Heavy Truck Mounted Rotary Air Drills (both Lever Arm and High Mast)
58-BH Joy Champion Rotary Air Drills
Also 42-T, 29-T and 27-T Well Drills

FRANK SWABB EQUIPMENT CO., INC.
313 Hazleton Nat'l. Bank Bldg.
Hazleton, Pa. GLadstone 5-3658

FOR SALE
One 22 HD Sullivan Core Drill
Complete with power unit; excellent condition; Priced for immediate sale. Contact
Monongahela Machinery and Equipment Co.
Box 250, Monongahela, Pennsylvania

THE WISE OLD OWL SAYS DON'T BE FOOLED

It's the "Dollar Difference" that Counts! We Own What We Advertise.

Buy from the largest stock of good mining equipment in America. Includes all types of Joy Cutters, Loaders, Shuttle Cars, Cat Trucks, Belt Conveyors, Chain Conveyors, etc.

JOY EQUIPMENT—rebuilt

3—Joy 20-BU Loaders, latest type.
2—Joy 14-BU Loaders, low pedestal.
1—Joy 14-BU Med. Pedestal Loader.
2—Joy 14-BU High Pedestal Loaders.
3—Joy 12-BU Loaders, 9E, latest type.
2—Joy 12-BU Loaders, 7E, excel.ent.
6—Joy 8-BU Loaders.
3—Joy 11-BU loaders.
2—Goodman 660 Loaders on Cats, excellent
1—Joy 6BC Shuttle Car—rebuilt
4—Joy 8BC Shuttle Cars, lowest type.
1—Joy 5BC Shuttle Car—rebuilt
2—Joy 32E9 Shuttle Cars
2—Joy 32E10 Shuttle Cars.
2—Joy 32E15 Shuttle Cars.
1—Joy T-1 Standard Cat Truck.
1—Joy T-2-5 Cat Truck, AC.
2—Joy T-2-5 Cat Trucks, 250 volt DC.
1—Joy T-2-6 Cat Truck with reel.
4—Joy 11-B Cutting Machines, like new.
1—Joy 7B Cutting Machine, excellent.
2—Goodman 512 Cutting Machines with Bugdusters.
4—Goodman Machines on Cats, 31" high. All hydraulic.
1—Goodman 512 Cutting Machine, perfect.

LOCOMOTIVES

2—Jeffrey, 20 ton, type MH-110, 42" and 44" Ga.
4—Jeffrey, 13 ton, type MH-110, 36", 42" and 44" Ga.
3—Jeffrey, 10 ton, type MH-78, 42" and 48" Ga.
12—Jeffrey, 6 ton, type MH-88, 42", 44" and 48" Ga.
3—Jeffrey, 4 ton, type MH-96, 42", 44" and 48" Ga.
1—G.E. 4 ton, type 825, Locomotive, 26" high.
10—G.E. 6 ton types 801, 803, 821 Locomotives, 42", 44" and 48" Ga.
1—G.E. 8 ton, type 822 Locomotive, 44" Ga.
3—G.E. 10 ton, type 809, Locomotives, 42", 44" and 48" Ga.
1—G.E. 10 ton 829 Locomotive 36" Ga.
1—Goodman 4 ton, 8-30 Locomotive, 22" above rail.
8—Goodman, type 33, 6 ton, 44" and 48" Ga.
3—Goodman 8 ton, type 32A, 36", 44" and 48" Ga.
3—Westinghouse, type 902, 4 ton, 42" and 48" Ga.
2—Westingtouse, type 904, 6 ton, 44" and 48" Ga.
2—Westinghouse, type 906, 44" and 48" Ga.
2—Westinghouse, type 907, 10 ton, 44" and 48" Ga.
2—36" Ga. Battery Locomotives.

TIPPLE EQUIPMENT

1—Cedar Rapids portable super Screening Plant.
1—Allis Chalmers 5' x 14' Ripple Vibrator.
1—4' x 10' Robbins Gyrex Vibrator.
1—4' x 14' Vibrator, three deck, low head.
Feeders, Drag Conveyors, and Loading Booms.

CUTTING MACHINES

3—Jeffrey 29UC Universals on cats.
2—Goodman 212-C-3, AC, low vein.
4—Baby Goodman 212's, rebuilt.
3—Goodman 312's, 18" high.
2—Goodman 412's, 18" high.
2—Goodman 412's with Bugdusters, like new.
15—Goodman 12AA's and 112AA's.
10—Goodman 324 Slabbers.
2—Goodman 724 Slabbers.
30—Jeffrey 35L's, like new, 17" high.
15—Jeffrey 35B's and 35BB's
2—Jeffrey 29B's and track.
2—Jeffrey 29C's, track mounted.
2—Sullivan CR-10's, 15" high.

LOADING MACHINES

17—Joy Loaders, all types.
2—Jeffrey 6I CLR's on rubber, 26".
3—Jeffrey L-500 Loaders.
2—Myers Whaley No. 3 Automat Loaders.
3—Clarkson Loaders, 26" above rail.

CONVEYORS

2—Joy 30" Belt Conveyors, 10 to 15 H. P.
2—Goodman 97-C's, 26".
3000' 30" Conveyor Belt.
5—Jeffrey 6I AM Room Conveyors, 300 ft.
10—Jeffrey 6I HG Face Conveyors.
2—6IEW Elevating Conveyors.
2—6I WH, 5" Room Conveyors, 300 ft.
4—Joy Ladel UN-17 Shakers.
10—Goodman G-12½ and G-13 Shakers.

CONVERTERS AND DIESEL PLANTS

1—50KW G. E. TC-6, 275 volt, Rotary Converter
3—100KW, G. E. TCC-6's, 275 volt, Rotary Converters.
1—150KW, G. E. HCC-6's, 275 volt, Rotary Converters.
1—200KW G. E. HCC-6 Rotary Converter, 275 DC
3—300KW, G. E. HCC-6 Rotary Converters, 275 DC.
1—200KW Westinghouse Rotary Converter, 275 DC.
1—300 KW Westinghouse Rotary Converter, 275 DC.
All the above with 6900/1300 and-or 2300/4000 primary transformers)
1—65 KW MG Set, General Electric, 275 volt.
2—150 KW MG Set, General Electric and Westinghouse.
1—200KW MG Set, Ridgeway.
1—Cummins 125 KW, Diesel with 250 Volt DC Generator.
1—700 H.P. Shaft Hoist, complete.
Complete steam plant, will sell all or any part.
Boilers, like new, 1100 H. P. and 500 H. P. Also transformers, turbines, etc.
Complete Tipples with Cleaning Plants.

MISCELLANEOUS

10—Air Compressors, 1 H. P. to 40 H. P.
40—Mine Pumps, all types.
Pipe, Plastic Steel Transit, all sizes, 1" to 6".
15 Mine Cars, drop bottom, 42" Ga.
90 Mine Cars, end dump, 36" Ga.
150 Mine Cars, 18" high, end dump, 44" Ga.
380 Mine Cars, end dump 20" high, 48" Ga.
15 Brown Fayro HKL and HGD Car Spotters.
1—12 ton Differential Slate Larry.
1—Kanawha Hillside Dump.
5—Low vein Water Cars.
Incline Hoists, 25 to 50 H. P.
Machine Tools for mine shops.
400 tons Rails, all sizes.
10 tons Copper Trolley and Feeder.
300 Transformers from 1 to 2,000 KVA, 110 to 13,000 Primary Volts.
400 Electric Motors, 3 to 200 H. P.
Suspension Bridge, 300 ft. long for river crossings.
1—International TD-24 Angledozer.
Huge stock of mine supplies.

Thousands of Other Items — **Send us your Inquiries**

J. T. FISH & COMPANY

Logan, West Virginia — **Phone 2825**

—TRANSFORMERS—

BOUGHT AND SOLD

We carry a large stock of rebuilt and guaranteed transformers, and invite your inquiries.

Custom-built transformers and coils manufactured to your specifications.

Expert Repair Service—all makes and sizes of transformers rewound, repaired and redesigned. Ask for our price schedule.

THE ELECTRIC SERVICE CO., INC.

5322 Hetzel St. — **Cincinnati 27, Ohio**

40 Years' Dependable Service

FOR SALE

Peerless Brand New Submersible Pumps 250 GPM at 47 foot head, Brass construction with 75 foot cable, check valve, strainer and controller. Outlet for 2½" Hose. 4 H.P.—230 Volt DC. Dimension—9" Diameter x 29" long. Government Cost $991.00 ea.

Price—$125.00 ea. F. O. B. West Trenton or Ogden, Utah

FRANKLIN MACHINE PRODUCTS CO., INC.
WEST TRENTON, NEW JERSEY

Save on Your INDUSTRIAL TRACK

FOSTER QUALITY — FULLY GUARANTEED

RELAYING RAILS

Handle more cars better—cost less to install and maintain. Foster stocks all Rail Sections 12# thru 175#, Switch Material and Track Accessories.

SEND FOR CATALOGS

RAILS - TRACK EQUIPMENT - PIPE - PILING

L. B. FOSTER CO.

PITTSBURGH 30 • NEW YORK 7 • CHICAGO 4
ATLANTA 8 • HOUSTON 2 • LOS ANGELES 5

HYDROMATIC BRAKES

(2)—manufactured by The Parkersburg Rig And Reel Co. Type "S"—size 32"—15 PSI—720 RPM—4000 HP—5" shaft diameter.

EQUAL TO NEW—TEST RUN ONLY

The Boston Metals Co.

313 E. BALTIMORE STREET

Baltimore 2, Md. • Lexington 9-1900

NEW and REBUILT STORAGE BATTERY

LOCOMOTIVES

1½ to 10 Tons 18" to 56½" Track Gauge.

GREENBURG MACHINE CO.
Greenburg, Pa.

LOCOMOTIVES

STORAGE BATTERY — TROLLEY

THE IRONTON ENGINE COMPANY

FARMINGDALE, NEW JERSEY

(Formerly Ironton, Ohio. 1902-1950)

FOR SALE

44—All-steel rotary dump mine cars ACF, 12' x 6' x 3', 4 ton, 42" gauge.

Call or write:

WESTERN POCAHONTAS CORP.
P. O. Box 509, Huntington, W. Va.
Phone: 28268

RAILS

MIDWEST STEEL CORP.
550 DRYDEN ST., CHARLESTON, W VA.

THE BEST IN MINING EQUIPMENT

TRACKLESS EQUIPMENT

(C) 1—10BC Shuttle Car, Completely modern
(W) 1—6BC Joy Shuttle Car Frame
(C) 2—6BC 5E Joy Shuttle Cars, Elevating Discharge
(W) 2—5SC Joy Shuttle Cars
(C) 1—32E7 Joy Shuttle Car
(C&W) 4—32D Joy Shuttle Cars
(C) 1—Lee Norse Shuttle Car
(C) 1—T2-5 Joy Cat Truck
(C) 1—T2-6 Joy Cat Truck-Like New
(C) 1—12BU 9E Joy Loader
(C) 1—8BU As Is or Rebuilt, 500 Volt
(C) 2—8BU As Is or Rebuilt, 250 Volt
(W) 1—8BU 11G, 220-440V AC
(W) 2—Baker Battery Supply Tractors-Permissible
(C) 1—1224 Goodman Cutter, Rubber, Mounted
(C) 1—360 Goodman Loader
(C) 1—29U Jeffrey, Rubber Mtd.
(C) 1—PL11-5E Joy Elevator
(C) 1—PL11-7E Joy Elevator
(C) 2—PL11-8E Joy Elevators
(W) 4—40 H. P. Acme Self Propelled Air Compressors Permissible.

CONVEYORS

(W) 1—52B 25" Jeffrey Conveyor, 900' center to center
(W) 2—95A 24" Goodman Conveyors, Approximately 500'
(C) 1—MTB 26" Joy Conveyor, 1000' centers, less belt
(C&W) 8—61AM Jeffrey Room Chain Conveyors
(W) 9—61HG Jeffrey Face Chain Conveyors
(W) 2—61EW Jeffrey Elevating Chain Conveyors
(C&W) 4—61W Jeffrey 15" Gathering Chain Conveyors
(C) 9—61W Jeffrey Drives
(C) 2—20CC Joy Chain Conveyors
(W) 4—15" Joy Chain Conveyors, Permissible
(W) 6—G15 Goodman Shaker Conv.
(C&W) 6—G12½ Goodman Shaker Conv.
(W) 1—PT12 Long Piggyback Conv.
(W) 32—Goodman Power Deckbills, Model 477, G1½.

CUTTING MACHINES

(C&W) 4—7AU Track Mtd. Sullivans
(W) 6—11B Sullivans, Both 35 & 50 H.P.
(W) 1—29C Jeffrey Arc Wall
(C) 1—29U Jeffrey 220-440 Volt, 42" T.G.—Excellent
(C) 1—35L Jeffrey
(C&W) 15—35B & 35BB Jeffrey As Is or Rebuilt
(C&W) 6—12AB Standard Goodman, 35 H.P.
(C&W) 412AA Standard Goodman, 50 H.P.
(W) 1—212AA Baby Goodman
(W) 1—212 G3 Baby Goodman 220-440 Volt AC
(W) 1—312 G3, 220-440 V AC Goodman
(C) 2—412 CA Goodmans
(W) 4—512 DA Goodmans
(C) 2—712 Goodmans
(C) 1—824 Goodman, 42" T.G.
(C) 1—1224 Goodman, Rubber Mtd.
(C) 1—Lot Machine Trucks for Jeffrey & Goodman

LOCOMOTIVES

(C) 1—MH12 Jeffrey
(C) 1—MH96 Jeffrey
(W) 1—MH88 Jeffrey
(C) 1—MH150 Jeffrey, 42" T.G.
(C) 1—MH110 Jeffrey, 42" T.G.
(C&W) 4—MH100 Jeffrey, 36" T.G.
(W) 5—HM803 GE, 36", 42" or 44" T.G.
(W) 5—HM823 GE, 42" T.G.
(W) 1—8-30 Goodman, 4 ton, 25" high, any T.G.
(C&W) 3—3314T Goodmans, 6 Ton
(W) 1—8 Ton Goodman
(W) 1—884 West., 6 Ton Locomotive
(W) 1—6 Ton, G.E. Battery Locomotive with batteries—All New

MINE CARS

(W) 22—42" T.G. End Dump, 19" High
(W) 50—36" T.G. ACF Drop Bottoms Cheap
(W) 15—36" T.G. Sanford Day, Drop Bottom
(C) 20—42" T.G. End Dump—Wood
(W) 50—44" T.G. End Dump—3 Ton Enterprise, All Steel, Excellent
(W) 75—44" T.G. End Dump, 2½ Ton Comp. Cars
(W) 65—44" T.G., E.D., 2 Ton, Enterprise-Composite
(W) 100—44" T.G., E.D., 1½ Ton, 23" High-Composite

SUB STATIONS

(C) 1—100KW, GE Motor Generator Set
(W) 1—200KW West. Rotary, 1200RPM 2300-4000 V. AC, 275 DC, Automatic Breakers
(C) 1—200KW, HCC6, GE Rotary 2300-4000V., 275 V. DC
(W) 1—150W West. MG Set, 1200RPM, 2200 Volt, 275 DC
(W) 1—150KW GE, MG Set, 1200RPM 2200 Volt, 275 DC
(C) 1—150KW West. MG Set, 200 V.
(W) 1—75KW Diesel Generator, 250 Volt DC

MISCELLANEOUS

(W) 1—3 Track, All Steel Tipple, Located at Insull, Kentucky
(C&W) 8—HKL Brown Fayro Car Spotting Hoist
(C) 1—Nolan Automatic Car Spotter
(C) 1—HKM Brown Fayro Car Spotting Hoist
(C&W) 12—Hoist, 5 to 1000 H.P.
(W) 2—Sets Mine Track Scales
(C) 1—Sullivan Air Compressor
(W) 2—Crossover Dumps—New & Used
(C&W) 16—Coal Drills, A7, 56A, 571 & 572, AC & DC
(W) 1—Truck Bed for Stoker Coal—New
(W) 1—Armco prefab steel building—130' Long
(W) 1—5' Morrow Shaker
(C) 1—42" Loading Boom, 32' Long
(C) 1—48" Loading Boom
(W) 1—Lot 18" Belt Conveyor for 30' to 150'
(W) 1—40" Morrow Scraper Conveyor 250' Long
(C) 1—D4 Caterpillar Dozer
(C) 1—42"x36" Jeffrey Flex Tooth Crusher
(C) 2—American mine door rock dusters
(C) 1—20 H.P. MSA Rock Duster—Permissible
(C) 1—5x10' Double Deck Screen
(C) 1—6' Aerodyne Fan
(C) 1—105 Cu. Ft. Schramm Air Compressor
(C) 1—105 Cu. Ft. Acme Air Compressor—Track Mtd.
(C) 1—Winslow Truck Scale
(C) 2—Howe Truck Scales
(C) 2—ITE Automatic Circuit Breakers
(C&W) 6—28J & 38J Joy Motors
(C&W) 5—Battery Chargers—Locomotives or Shuttle Cars

We Are Always In The Market For Good Equipment—Call Us Day Or Night

ELECTRIC & MACHINE SUPPLY COMPANY
MINING & INDUSTRIAL EQUIPMENT

Whitesburg, Kentucky
P. O. Box 610—Ph. 2590 or 2594
*(W) Denotes equipment located at Whitesburg, Kentucky
BILL CONLEY

Clarksburg, West Virginia
P. O. Box 227 — Phone 3-0253
*(C) Denotes equipment located at Clarksburg, West Virginia
H. J. (HANK) UBBING

MELVIN ADAMS

Please Direct Your Inquiries to Proper Location for Prompt Quotation — ALL INQUIRIES APPRECIATED

COAL CRUSHERS
1—24" x 24" Jeffrey Single Roll
1—30" x 30" Jeffrey Single Roll

ELECTRIC HOISTS
1—11 HP Vulcan, single drum
1—20 HP Vulcan, single drum
1—22 HP Vulcan, double drum
1—25 HP Vulcan, single drum
1—30 HP Vulcan, single drum
1—37 HP single drum
5—50 HP single drum
2—60 HP single drum
1—75 HP Vulcan Double Drum
3—100 HP Box single drum
1—112 HP Vulcan, single drum
1—150 HP Vulcan, single drum
2—125-200 HP Ottumwa single drum
1—250 HP Ottumwa single drum
1—400 HP Stearns-Roger, single drum

BATTERY LOCOMOTIVES
3—3½-4 ton Mancha, 24" ga.
1—4 ton Westinghouse, 24" ga.
1—4 ton Ironton, 36" ga.
2—6 ton General Electric, 36" ga.
2—7 ton General Electric, 36" ga.
1—7 ton Atlas—36" ga.
3—8 ton Ironton, 36" ga.
2—8 ton General Electric, 36" ga.
2—8 ton Goodman, 36" ga.
4—10 ton Atlas, 36" ga.

TROLLEY LOCOMOTIVES
2—10 T. Jeffrey, 42" ga.
1—13 T. Goodman, 42" ga.
1—13 T. Jeffrey, 42" ga.
1—15 T. Jeffrey, 42" ga.

SHUTTLE CARS
1—Joy model 6OD3P, battery operated
7—Joy model 6OD1, battery operated

MINE FANS
1—120" Joy La-Del axial flow fan, model L-14
1—8H Jeffrey 42" aerodyne fan
1—7' Jeffrey aerodyne 2 stage fan

SINCE 1898 DEALERS IN DEPENDABLE RECONDITIONED MINING MACHINERY OF ALL TYPES

MORSE BROS. MACHINERY COMPANY
2900 Brighton Blvd., Denver, Colorado

SUBSTATIONS
1—300 KW G.E. Mine Type Rectifier, 275 V DC, 3 phase, 60 cycle, 2300/4000 V AC. Used very little. Like new
3—300 KW G.E. Rotary Converters, Type HCC-6, Form P, 1200, 250/275 V, complete with switchboards, switchgear, 1600 amp. I-T-E automatic reclosing circuit breakers.
3—200 KW G.E. Rotary Converters, Type HCC-6, Form P, 1200, 250/275 V, complete with switchboards, switchgear, 1200 amp. I-T-E automatic reclosing circuit breakers.
Above converters are equipped with three single phase, 60 cycle transformers, 2300/4000 V AC.
3—300 KW Westinghouse M.G. Sets, 250/275 V, 3 phase, 60 cycle, 2300 V, 1200 speed, complete with switchboards and all necessary switchgear.
2—300 KW G.E. M.G. Sets, 250/275 V, 1200, 2300 V AC, complete with switchboards and all necessary switchgear.
1—300 KW Westinghouse M.G. Set, 250/275 V, 1200 RPM, 3 phase, 60 cycle, 2300 V, complete with all necessary switchgear and switchboards.

REBUILT LOCOMOTIVES
4—20-ton late type Westinghouse 940-C; 125 HP, ballbearing motors, air brakes, sanders, double end contactor controls, 48" to 42" gauge.
2—20-ton Jeffrey MH-77. Practically new.
4—15-ton Jeffrey MH-77
3—15-ton Jeffrey MH-110
2—15-ton Goodman 36A-04C
1—13-ton Goodman 36B-04C
4—10-ton Goodman 34B-04C
1—10-ton Jeffrey MH-143
1—10-ton Westinghouse 927-LD
7—8-ton Goodman 32-04T
2—8-ton very late type Jeffrey MH-100, permissible type, Timken roller bearing axles and journals, contactor controls. Serial Nos. 7917-7918, 42" gauge.
Above Locomotives are all 250 V DC. Track gauges run from 36" to 56½".

MISCELLANEOUS
5—14BU-3PME Joy Loaders, 4400 series. Good operating condition.
5—29U Jeffrey Cutting Machines, late type, permissible.
3—660-BH Goodman Loading Machines, full hydraulic, 250 V, late type, permissible.
4—42E-9 Joy Shuttle Cars.
2—5-SC Joy Shuttle Cars.
1—Jeffrey 6' Aerodyne Fan complete with 125 HP motor.

All types of single and double drum Hoists for all purposes.
Loading and Cutting Machines, Shuttle Cars, Steel Mine Cars—all gauges.
Mine Fans and 4- and 5-track steel Tipples.

WILL BUY

1—Single Drum Hoist with 800 to 1000 HP, 3 phase, 60 cycle, 2300 V motor, drum to spool approximately 2000' of 1½" rope, rope speed 100 FPM; must be complete in every respect. If you have anything to offer, mail us complete description and advise lowest price, f.o.b. cars, mine.

WANTED: Will pay spot cash for 14-BU, 8-BU and 11-BU Joy Loading Machines; 5-SC and 6-SC Shuttle Cars.

WE SPECIALIZE IN BUYING OUTRIGHT COMPLETE MINES THAT ARE GOING OUT OF BUSINESS OR FROM RECEIVERS IN BANKRUPTCY, ADMINISTRATORS OF ESTATES, ETC.

COAL MINE EQUIPMENT SALES COMPANY
FRANK J. WOLFE — **PHONE L.D. 34** — **SHELDON J. WOLFE**
TERRE HAUTE, INDIANA

MOTORS · GENERATORS
TRANSFORMERS
NEW · REBUILT
WORLD'S LARGEST INVENTORY
ELECTRIC EQUIPMENT CO.
PHONE STATION COLLECT GL 6783
P.O. BOX 51 ROCHESTER 1, NEW YORK

RELAYING RAIL
All Sizes
Track Accessories

LEFTON INDUSTRIAL CORP.
General Office: 212 Victor Street
St. Louis 4, Missouri

ALPHABETICAL INDEX TO ADVERTISERS

***Indicates more product information may be found in company advertising appearing in COAL AGE 1956 Mid-July Mining Guidebook and Buying Directory Issue. Check your Guidebook index.**

Acme Machinery Co. 133
*Allegheny-Ludlum Steel Corp. 10
*Allis-Chalmers Industrial Equipment Div. 97
Allis-Chalmers Construction Machinery Div. 8–9, 141
American Cable div. American Chain & Cable Co. 115
American Oil Co. 121
*American Pulverizer Co. 142
*American Steel & Wire div. 12–13, 16–17, 166
*Anaconda Wire & Cable Co. 159
Armstrong-Bray & Co. 158
Ashland Oil & Refining Co. 117
Atlas Powder Co. 152–153

*Baldwin-Lima-Hamilton (Constr. Equip. Div.) 172
Barber-Greene Co. 41
Bearings, Inc. 22–23
Bethlehem Steel Co. 28, 48, 98, 149
Bird Machine Co. 4
*Bowdil Co. 99
Bucyrus-Erie Co. 29, 151

*Cardox Corp. 42
Caterpillar Tractor Co. 44–45, 184
Chevrolet div. General Motors 175
Chicago Pneumatic Tool Co. 101
Cities Service Oil Co. 93
Coal Age 135, 178
*Columbia-Geneva Steel Div. 12–13, 16–17, 166
Connellsville Mfg. & Mine Supply Co. 120

*Davey Compressor Co. 134
*Detroit Diesel Engine Div. General Motors 127
Differential Steel Car Co. 112
Dodge Manufacturing Corp. 173
Dodge Div. Chrysler Corp. 138–139
Dorr-Oliver, Inc. 114
Dow Chemical Co. 157
Drott Manufacturing Corp. 35
Durakool, Inc. 116
duPont de Nemours & Co., E. I. (Explosives Dept.) 129
duPont de Nemours & Co., E. I. (Elastomers Div.) 20A

Emglo Products Div. M. Glosser & Sons, Inc. 116
Ensign-Bickford Co. 52
Ensign Electric Co. 144

Fairbanks Morse & Co. Scale Div. 50
Fairmont Machinery Co. 105
*Falk Corp. 170
Femco, Inc. 156
Firth Sterling, Inc. 43
Fletcher & Co., J. H. 104
Flexible Steel Lacing Co. 160
Flood City Brass & Electric Co. 110

*Gates Rubber Co. 108
Goodman Manufacturing Co. 19
Goodrich Industrial Products Co., B. F. 1
Goodrich Tire Co., B. F. div. B. F. Goodrich Co. 103
Guyan Machinery Co. 156

Hamilton Rubber Manufacturing Co. 119
*Harnischfeger Corp. 146–147
Hazard Insulated Wire Works 174
*Hendrick Manufacturing Co. 132
*Hewitt-Robins, Inc. 124–125
Heyl & Patterson, Inc. 31
Hulburt Oil & Grease Co. 2–3

International Harvester Co., Drott Mfg. 35
International Harvester Co., Payhaulers 136
International Harvester Co., Power 14–15
International Salt Co., Inc. 161

Jeffrey Manufacturing Co. 46–47, Third Cover
*Jones & Laughlin Steel Corp. 145
*Joy Manufacturing Co. 32–33, 104

Kennametal, Inc. 89
Koehring Co. 24–25

*LeRoi div. of Westinghouse Air Brake Co. 18
*LeTourneau-Westinghouse Co. 20, 143
Lee-Norse Co. 26
Link-Belt Co. Fourth Cover
Lubriplate div. Fiske Bros. Refining Co. 160
*Ludlow-Saylor Wire Cloth Co. 106
Long Co. 183

Manhattan Rubber div. 30
*McNally Pittsburg Manufacturing Corp. Insert between pp. 20-21, 122
Memphis Equipment Co. 132
Metal Carbides Corp. 177
*Mine Safety Appliances Co. Second Cover
Morton Salt Co. 171

*National Malleable & Steel Castings Co. 51
National Mine Service Co. 107
National Tube div. 12–13, 16–17, 166
Neff & Fry Co. 158
Newcomer Products, Inc. 162
*Nordberg Manufacturing Co. 111

Ohio Brass Co. Insert between pp. 96–97

Palnut Co. 176
Paris Manufacturing Co. 176
Pennsylvania Drilling Co. 176
Post-Glover Electric Co. 150

Raybestos-Manhattan, Inc. 30
Reynolds Metals, Inc. 113
*Roberts & Schaefer Co. 169
Roebling Sons Corp., John A. 155
*Rome Cable Corp. 34, 163

Sanford-Day Iron Works 38–39
Schroeder Bros. 148
Searchlight Section 178–181
Simplex Wire & Cable Corp. 21
*Simplicity Engineering Co. 137
Sinclair Refining Co. 109
Southland Co. 106
*Stamler Corp., W. R. 110
Standard Oil Co. (Indiana) 11
Stearns Magnetic Products div. of Indiana Steel Products Co. 167

*Templeton, Kenly & Co. 17
*Tennessee Coal & Iron Div. 12–13, 16–17, 166
*Texas Co. 6–7
Timken Roller Bearing Co. 123

*United States Rubber Co. (Electrical Wire & Cable Dept.) 91
United States Rubber Co. Mechanical Goods div. 95
*United States Steel Corp. 12–13, 16–17, 166
*United States Steel Export Co. 12–13, 16–17, 166

Vacoloy-Ramet Corp. 27
*Victaulic Co. of America 118

*Wedge-Wire Corp. 154
West Virginia Works Connors Steel Div. H. K. Porter Co. 20D
*Westinghouse Electric Corp. 36–37
Wickwire Spencer Steel div. 40
Wilcox Manufacturing Co. 49
Wilmot Engineering Co. 131

PROFESSIONAL SERVICES 178

CLASSIFIED ADVERTISING

F. J. Eberle, Business Mgr.

EMPLOYMENT OPPORTUNITIES 179

BUSINESS OPPORTUNITIES 179

EQUIPMENT

(Used or Surplus New) For Sale 179–181

WANTED 179

ADVERTISER'S INDEX

Boston Metals Co., Inc. 180
Coal Mine Equipment Sales Co. 181
Electric Equipment Co. 181
Electric & Machine Supply Co. 181
Electric Service Co., Inc. 180
Ellanovitz, Harry 179
Fish & Co., J. T. 180
Foster, L. B. 180
Franklin Machine Products Co., Inc. 180
Greensburg Machine Co. 180
Ironton Engine Co. 180
Lefton Industrial Co. 181
Midwest Steel Corp. 180
Monongahela Machinery & Equipment Co. 179
Morse Bros. Machinery Co. 181
Ohio Mining Co. 179
Swabb Equipment Co., Inc., Frank 179
Telephone Engineering Co. 179
Western Pocahontas Corp. 180

This index is published as a convenience to the reader. Every care is taken to make it accurate, but C. A. assumes no responsibility for errors or omissions.

How the Piggyback Conveyor System... keeps continuous mining machines working more hours per shift

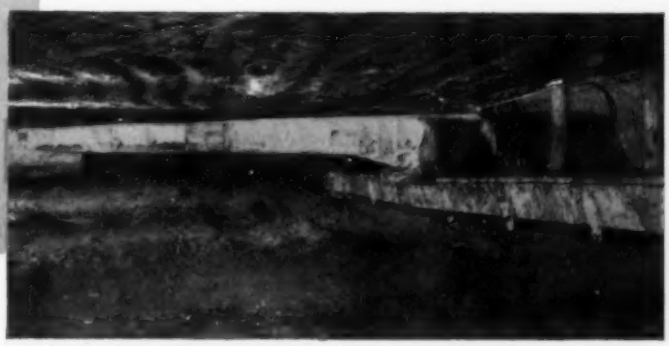
Third Pass
Second Pass
First Pass
Continuous Mining Machine (Any Type)
Approximate length . . 30'
LONG Model "88" Pigloader *
Receives directly from miner . . . serves as a mobile conveyor . . . provides mechanical cleanup and surge capacity . . . trams Piggyback* Conveyor.
Approximate length . . 17'
LONG Piggyback Conveyor
Transfers coal from loader into room conveyor without interruption or spillage. Pivot action of 180° at each end permits complete freedom of movement.
Approximate length . . 32'
Total Approximate Reach Away From Room Conveyor . . . . 79'
Enough to reach completely through breakthroughs, mine forward from breakthrough to breakthrough, pillar substantial blocks, etc.
LONG Mobile Chain-type Room Conveyor
Equipped with crawler-mounted, self-tramming conveyor drive, moving time is eliminated because one man can move and position this mobile head in less time than it takes to move the miner itself.
Approximate operating lengths . . . . . up to 400'.
Mobile Head
* Trade Mark
LONG Chain-type Gathering Conveyor

As many leading coal companies already know, the Piggyback Conveyor System is the most practical, most economical method of face transportation for continuous mining. Because it eliminates lost time for car changes, this continuous-flow equipment assures maximum working time at the face—makes it possible for continuous mining machines to operate more hours per shift. Coal is loaded and moved from the face to the outside in a steady, uninterrupted stream *as fast as it's mined*. The result: more tons per man, higher continuous tonnages and less cost per ton.

Whether you're using continuous mining machines or conventional mining units, it will pay you to consider the many advantages provided only by the Piggyback Conveyor System. We'll be glad to supply complete information—without obligation.

Check these advantages of the Piggyback System for continuous mining

Fewer delays • Higher capacity • Lower maintenance • Fewer men in face crew • Fewer nonproductive men • Less down time • Better cleanup • Better operator attention • Greater concentration of mining • Longer economical haulage distances.



Piggyback Conveyor System in operation, servicing continuous mining machine that has delivered single shift tonnages of over 800 tons. Receiving end of Piggyback is attached to Pigloader loading machine and follows it as it moves.

The LONG Company
OAK HILL, W. VA.

"MOVES MORE DIRT THAN ANYTHING I'VE SEEN"

NOTICE the huge, rolling load on the blade of this CAT* D9 Tractor, which is opening a new cut on strip mining operations for Shick Coal Co. of Starford, Pa. This big "King of the Crawlers" moves more than 9000 cu. yd. in a 20-hour day, six days a week, the year around. Besides stripping, it benches and cleans coal.

A. C. Shick, Jr., a partner in the firm, says, "The D9 is doing a really good job. I don't see how we got along without it. It moves more dirt than anything I've seen in the field." According to Mr. Shick, the company has always bought Caterpillar equipment because of its reputation for long work life and high coal production at low cost.

Output of the giant D9's Turbocharged, four-cycle Caterpillar Diesel Engine has now been increased to 320 HP. The D9 is available with long-lasting oil clutch or smooth torque converter drive, and with straight or angle blade to suit your operation. This big yellow machine can handle more than 9 cu. yd. per pass—and it does it with small-tractor handling ease. Features like hydraulically boosted operating controls, constant power drive for cable controls, in-seat starting and excellent visibility make the D9 the operators' favorite.

Your Caterpillar Dealer will gladly arrange an on-the-job demonstration of the new Cat D9 Tractor. See him for proof that it can help *you* produce more coal at less cost. And count on him whenever you need skilled service or genuine parts.

Caterpillar Tractor Co., Peoria, Illinois, U. S. A.

CATERPILLAR*

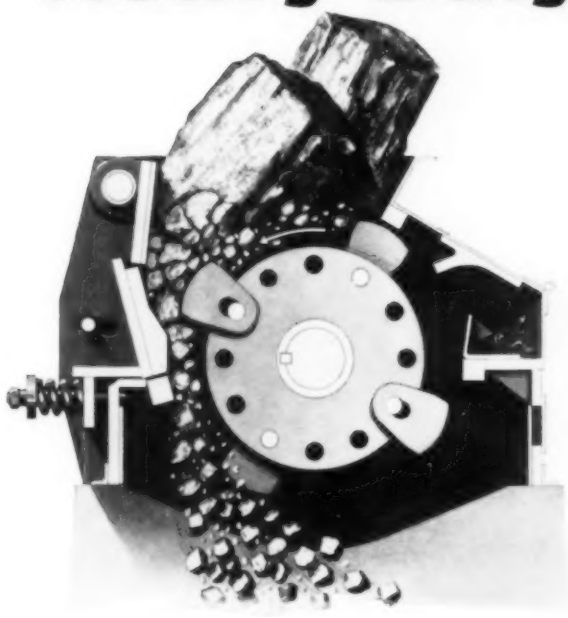
*Caterpillar and Cat are Registered Trademarks of Caterpillar Tractor Co.

NAME THE DATE... YOUR DEALER WILL DEMONSTRATE

To keep mine refuse moving freely,

reduce it with a **JEFFREY**

Heavy Duty Slugger CRUSHER



Among features which give ruggedness to this crusher are heavy-duty rotor with large diameter hammer pins, all-welded steel construction frame, and heavy renewable manganese liners.

THE Jeffrey Heavy Duty Slugger Crusher reduces large rocks and refuse from full seam mining to a size that can be readily handled on a belt conveyor. The resultant sized product greatly decreases the possibility of spontaneous combustion at the dump.

This crusher is, in effect, a high-speed single roll unit, although the crushing is done entirely by impact. Hammers weighing 100 to 150 pounds each hit the rock and waste with sledge hammer blows. Feed ranging up to 54" square x 24" thick (in the 42" x 66" size crusher) can be reduced quickly to almost any sized product between 8" x 0" and 3" x 0".

For every coal crushing problem, write for Bulletin 784-C to assist you in selecting the proper machine. The Jeffrey Manufacturing Company, Columbus 16, Ohio.

JEFFREY

CONVEYING • PROCESSING • MINING EQUIPMENT • TRANSMISSION MACHINERY • CONTRACT MANUFACTURING

It's not just static strength...

RESISTANCE TO TENSILE STRESS is achieved by use of properly heat-treated, accurately-machined side bars made of premium steel and fitted with properly-hardened pins, bushings and rollers. But to resist *operational* stresses, additional controls over dimensional accuracy, uniformity and roller resiliency are essential.

STRENGTH OF CHAIN IN MOTION is accomplished through tensile strength *plus* special Link-Belt refinements. These include pitch-hole preparation, micro-finish of parts, special processing of sidebars, prelubrication and rigid quality control from initial selection of materials to final protective boxing.

it's *dynamic strength*

in LINK-BELT Roller Chain that fights fatigue

On high-speed drives or heavy conveying jobs, the components of every pitch of roller chain face severe and repeated operating stresses—engagement with sprockets, shock of starting loads, centrifugal loads and others. That's why *dynamic strength*—ability of chain to resist these stresses—is so important. And it's built into *every length* of Link-Belt Precision Steel Roller Chain.

How is dynamic strength developed? In addition to Link-Belt "extras" . . . special design, manufacturing and processing steps provide required properties of uniformity and accuracy for long-life operation.

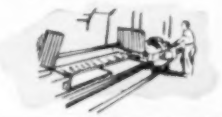
Talk over your roller chain needs at your nearby Link-Belt office or authorized stock-carrying distributor. Ask for Book 2457, covering this complete line of single and multiple widths, in ¼ to 3-inch standard pitch, 1 to 3-inch double pitch. 14.272

LINK-BELT

ROLLER CHAINS & SPROCKETS

LINK-BELT gives you dynamic strength that comes from these important EXTRAS

PRE-STRESSING of multiple width chain provides uniform load distribution.



SHOT-PEENED ROLLERS have greater fatigue life, added ability to withstand impact.

CLOSER HEAT-TREAT CONTROL —coupled with rigid testing insures uniformity.

LOCK-TYPE BUSHINGS (applied on a range of sizes) end a cause of stiff chain.

LINK-BELT COMPANY: Chicago 9, Birmingham 5, Cleveland 15, Denver 2, Detroit 4, Huntington 9, W. Va., Indianapolis 6, Kansas City 8, Mo. Louisville 2, Pittsburgh 13, Seattle 4, St. Louis 1, Scarboro (Toronto 13), Springs (South Africa).